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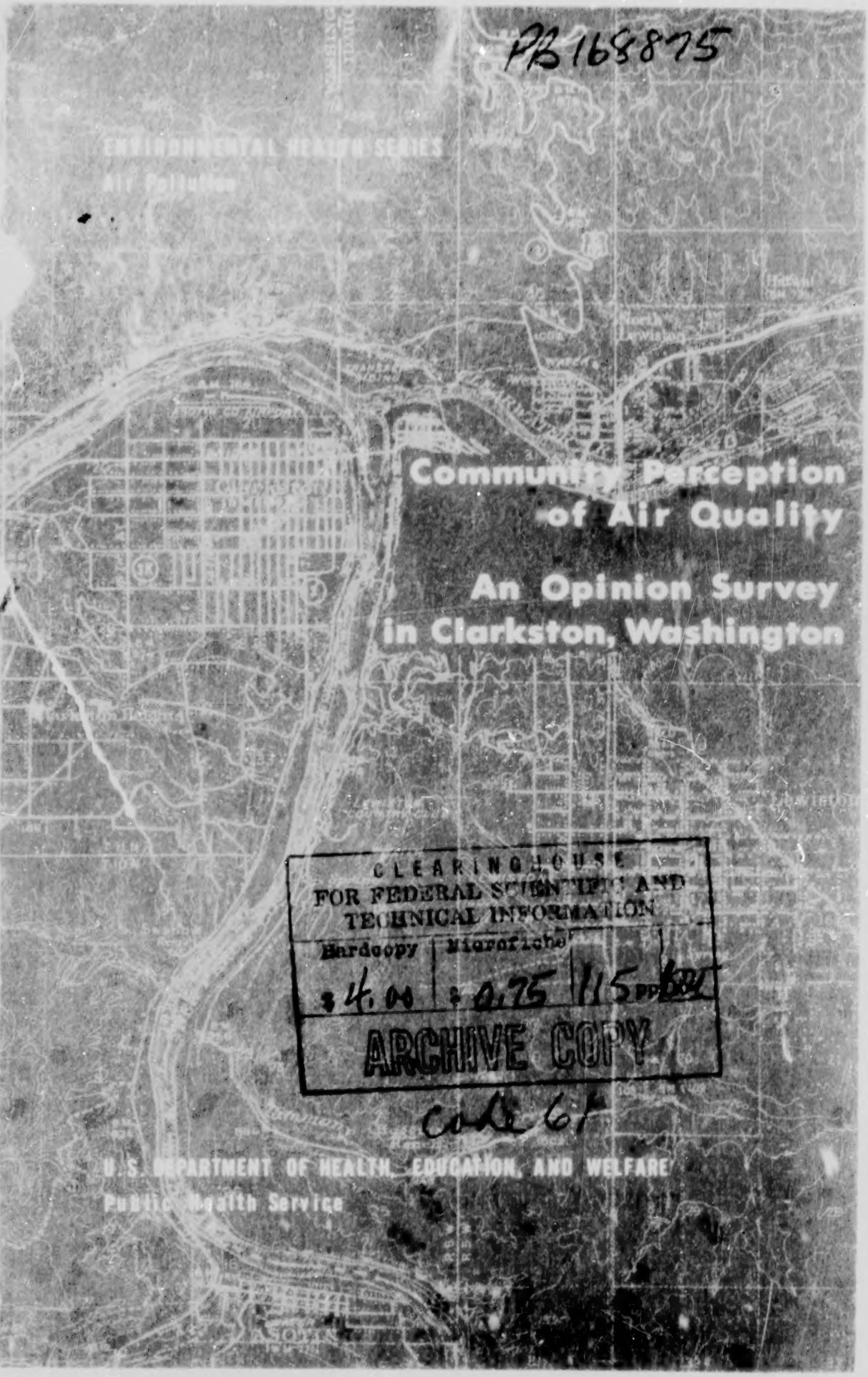

Community Perception of Air Quality

An Opinion Survey in Clarkston, Washington

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

COMMUNITY PERCEPTION OF AIR QUALITY:
AN OPINION SURVEY
IN CLARKSTON, WASHINGTON

Nahum Z. Medalia, Ph.D.
Staff Sociologist, Division of Air Pollution
Washington, D. C.

Sampling Design and Interviewing
Under Direction of

A. L. Finkner, Ph. D.
Research Triangle Institute
Durham, North Carolina

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Air Pollution

Robert A. Taft Sanitary Engineering Center

Cincinnati, Ohio

June 1965

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PARTICIPANTS

Washington State Department of Health, Seattle, Washington

Peter W. Hildebrandt
Ronald Klingman
Douglas Russell
Eugene Sabotta
Robert L. Stockman
Roger Smith

Research Triangle Institute, Durham, North Carolina

A. L. Finkner, Ph. D.
Daniel G. Horvitz, Ph. D.
Donald Searls, Ph. D.

U. S. Public Health Service

Nahum Z. Medalia, Ph. D., Staff Sociologist, Division of Air Pollution, Washington, D. C., 1961-62
Austin N. Heller, Deputy Chief, Technical Assistance Branch, Division of Air Pollution, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio
Stanley Sclove, *Mathematical Statistician, Statistical Services, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio
Mrs. Anna R. Crocker, Analytical Statistician, Field Studies Branch, Division of Air Pollution, Washington, D. C.
Lincoln Steigerwalt, Statistician, Sociologists' Staff, Division of Air Pollution, Washington, D. C.
Bruce Briggs, Statistician, Social Studies Branch, Division of Dental Public Health and Resources, Washington, D. C.

* Summer of 1962

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FOREWORD

To comply with a request for assistance from officials of the City of Clarkston, a cooperative interstate study of air pollution was conducted in the communities of Lewiston, Idaho, and Clarkston, Washington, during the winter of 1961-62. The request was motivated by public complaints about reduced visibility, damage to house paint, tarnishing of silver, undesirable odors, and suspected effects on health resulting from air pollution. The kraft pulp mill located near Lewiston was cited as a major source of pollution. The two communities are in a deep, narrow valley at the confluence of the Snake and Clearwater Rivers. The cities frequently experience poor atmospheric ventilation owing to low wind speeds and low-level inversions.

The purpose of the joint study was to determine the nature and extent of air pollution in the two communities, and to assemble data and information needed as a basis for remedial action. Results of the study are presented in a report entitled, "A Study of Air Pollution in the Interstate Region of Lewiston, Idaho, and Clarkston, Washington," published by the U. S. Department of Health, Education, and Welfare, Public Health Service, Division of Air Pollution, Cincinnati, Ohio (1964).

The opinion survey in Clarkston, Washington, was an integral part of this study. It represents the application of a behavioral science in the objective assessment of the air pollution problem in Clarkston.

NAHUM Z. MEDALIA*

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*Present address: Chatham College, Pittsburgh, Pennsylvania.

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ABSTRACT

In a community with a population of 7, 000 and located approximately 4 miles downwind from a pulp mill, a public opinion survey was taken to analyze the environmental stress of air pollution on a sample of household heads and spouses, along two principal attitudinal dimensions: awareness and concern. Of those interviewed, 91 percent perceived air pollution in the community as a malodor problem; 74 percent perceived it as a problem of visibility; and 62 percent as a problem of nose-throat irritation. A Guttman-type scale showed high concern with air pollution among 48 percent of the sample; low to moderate concern among 31 percent; and minimal concern among 21 percent. Although exposure to odorous pollutants in ambient air appeared roughly equal for all members of the sample, their concern with air pollution was found to vary directly with social status and attitude characteristics such as civic pride, desire to ameliorate the situation, length of residence in the community, and occupational prestige of the household head.

COMMUNITY PERCEPTION OF AIR QUALITY: AN OPINION SURVEY IN CLARKSTON, WASHINGTON

"If men define situations as real, they will be real in their consequences." W. I. Thomas

INTRODUCTION

In its report, "National Goals in Air Pollution Research" (August 1960, p. 20-21), the Surgeon General's Ad Hoc Task Group on Air Pollution Research Goals states: "The aspects of air pollution which are most apparent and of greatest personal concern to the individual probably are irritation to the eyes, nose, and throat, malodors, and the reduction of visibility. The pollutants responsible for these effects are undesirable whether or not they cause long-range health effects or economic losses, because they constitute an annoyance to people. The nuisance aspects of these effects together with those related to soiling give rise to the greatest number of complaints received by air pollution control authorities. There is no doubt that a person's well-being is eventually affected by exposure to these sensory annoyances and that this may result in economic loss."

With this research mandate in view, the cooperative program for aerometric study in the Lewiston-Clarkston region included a public opinion survey of Clarkston to determine the extent of annoyance with air pollution expressed by persons in that city. Administration of a public opinion survey in Lewiston, Idaho, proved unfeasible. As part of this objective, the survey sought to determine the nature of health and property effects that might be attributed to air pollution by Clarkston residents; and the nature of actions taken, planned, or recommended as desirable with reference to air pollution. Finally, the survey aimed at determining associations between expressed concern or annoyance with air pollution on the one hand, and socio-economic characteristics of persons who expressed these concerns, on the other. Interviewing for the public opinion study took place in May 1962.

While an attitudinal study of this sort is rare in environmental health literature, it is not unique. Precedents for it were carried out in the State of California in 1956;[1] in Buffalo, New York, in 1958[2] and in March 1962;[3] in Nashville, Tennessee, 1959;[4] in the towns of Monsteras and Paskallavik, Sweden, 1960;[5] and in the Wilmington-Middletown area of Delaware, 1960.[6] A study similar to those cited above but not directly concerned with air pollution was made in March 1961 by the National Opinion Research Center (NORC), University of Chicago, on "Community Reactions to Air Force Noise."[7] The procedures used and results obtained from these studies guided the conduct and analysis of the present survey.*

The following section describes the steps taken to maximize the objectivity of this survey of public opinion concerning air pollution in Clarkston, Washington.

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*A report of a study, which appeared subsequent to the preparation of this report, contains some additional references to recent socio-psychological research on environmental health in Scandinavian countries: Jonsson, Erland. "Annoyance Reactions to External Environmental Factors in Different Sociological Groups," Acta Sociologica, Vol. 7, Fase 4, 1964.

SURVEY PROCEDURES

Design

The three principal operating components of any opinion survey are the questionnaire, the selection or sampling of respondents, and the structuring of the interview situation through interviewer training and supervision.

THE QUESTIONNAIRE

Uppermost in the minds of most persons who read a report of a questionnaire-based study is the issue of questionnaire bias. Most commonly this term suggests that the survey instrument was designed to bring out pre-determined results either by omitting unfavorable alternates in multiple choice items, or, through artful wording of questions, suggesting responses presumably desired by the investigator. Unfortunately, this writer knows of no set formula for building in or for avoiding questionnaire biases to the complete satisfaction or dissatisfaction of every reader. Failing such a formula, the writer can only discuss the general principles that guided construction of the survey instrument used in Clarkston; principles that would hopefully yield a definition of the air pollution situation as supplied by each respondent rather than by the questionnaire designer.

First, we used open-ended questions, giving the respondent ample opportunity to structure responses in his own way. The two most important applications of this are probably items 3A and 15 of the survey questionnaire (Appendix A) which ask respondents to state in their own words whether there are any things they do not like about living in Clarkston, and what they consider to be the main sources of air pollution in the Clarkston area.

Second, through individual item construction and sequence ordering, respondents were never put in the position of having to say that air pollution is a problem or even exists in Clarkston. The clearest application of this principle is in item 11, "Do you think there is air pollution in Clarkston at any time during the year - Yes-No"; and in the sequence instructions for that question: "If NO, skip to question 19" (items 12-18 assume that the respondent believes air pollution does exist in Clarkston). Breaches of this principle may unfortunately be observed in items 9 and especially 21, neither of which offer the respondent an opportunity to state that air pollution is non-existent in Clarkston. Whether this failure biased seriously the respondents' answers to other items of the questionnaire, and if so in what direction, must be left to the reader to decide. The writer can only note that question 21 is the third to the last on the questionnaire, and that respondents who believed air pollution non-existent in Clarkston did not hesitate to express their objections to this item to interviewers. (See Interviewers' Suggested Revision of Questionnaire, Appendix D).

Third, insofar as possible, we used questions taken directly from other studies to avoid the charge that items were designed with some situation peculiar to Clarkston in mind. Thus Items 1 to 3 were taken from the National Opinion Research Center study of aircraft noise; 5 to 8, 10, and 17 to 20 from the March 1962 study in Buffalo; and item 9 from the 1958 Buffalo study of public awareness of air pollution.

Finally, an attempt was made, through sequence ordering of the items, to focus the interview initially on general community health problems, giving the respondent an opportunity to mention air pollution spontaneously as such a problem if he desired, rather than suggesting it to him by the wording of the questions. More is said on this point in the section on structuring of the interview situation.

The foregoing precautions were all aimed at avoiding the bias of building into the questionnaire an overestimate of the seriousness of the Clarkston air pollution situation or a prejudgment of source, as (or if) defined by respondents. To avoid the opposite bias, that of under-estimating respondents' awareness of air pollution and its severity, the only precaution taken was to employ projective questions of the type, "How do you think most people feel about air pollution in this area?" (questions 19 and 20). Question 22 is situational as well as referential in character: "What do you think is the most important thing people should do about air pollution where it exists?"

Whether or not we succeeded in producing a survey instrument free from all bias as to the existence, the severity, or the source of air pollution in Clarkston is of course a question the reader must decide for himself. In any case, the writer believes the questionnaire is a minor source of respondent bias in an opinion study compared to respondent selection or interview structuring.

SAMPLE SELECTION AND COMPOSITION

The primary objective of the public opinion survey was to determine the proportion of the population of Clarkston disturbed by air pollution. In actuality, however, the sample was taken from only a part of the total Clarkston population, namely, heads of households and their spouses if any, resident in Clarkston as of January 1, 1962. The 1960 census definitions of household, head of household, and spouse of household head were used. (See appendix B for detailed description of sampling procedure).

Restriction of the survey population in this way was dictated by considerations of efficiency and validity. As a general rule, the more homogeneous a population, the more reliable will be the population inferences drawn from a sample of a given size. To secure homogeneity of sampling population at least sacrifice of survey objectives, it seemed reasonable to give up the opinions of dependents and of those too young to be household heads, or their spouses, in order to obtain opinions about air pollution from only those persons who were primarily responsible for making and maintaining their residence in Clarkston.

A total sample size of 100 was set as the minimum that would yield estimates with the desired precision. To select households for the sample, a randomized cluster approach based on areal stratification was employed; to select respondents within each household, interviewers were instructed to call alternately on the household head, and on the spouse in each household visited. In households with no couple, the head was interviewed in all cases, regardless of sex.

STRUCTURING THE INTERVIEW SITUATION

Respondents were interviewed in their homes. To keep the survey as free as possible from the biases discussed, every effort was made to structure the interview so as to maximize each respondent's freedom to define the air pollution situation in Clarkston in his own way, within the general framework of the survey. Steps toward this goal included: (a) Defining the interview situation, (b) selecting interviewers, (c) training interviewers.

To avoid premature focus on air pollution, while still keeping the interview relevant to the identity of its sponsors, the Research Triangle Institute prepared a standard introduction and instructed interviewers to repeat it verbatim at the start of each interview. "Good (morning, afternoon, evening). My name is _____________. I am working with the Research Triangle Institute as an employee of the Washington State Department of Health. We are conducting a survey regarding certain health conditions in Clarkston. To do this we need help from the residents of the city. May I speak to the (lady, man) of the house for a few minutes?"

Four male employees (all statisticians) of the Washington State Health Department conducted the interviews; none, however, were employed by the Air Sanitation and Radiation Control Section of that Department. Two had previous experience in house to house surveys with the Psychological Corporation of New York. They had been residents of the State of Washington from 10 to 34 years, but none had ever lived in Lewiston, Idaho, or Clarkston, Washington, or in any of the counties contiguous to those cities. No interviewer was known personally to any respondent he interviewed.

To train and supervise interviewers, the Research Triangle Institute prepared a detailed manual of instructions (Appendix C), a copy of which was given each interviewer, and assigned an experienced staff member to work in Clarkston both prior to and during the actual survey. A critique of the results of the interviewing was held daily.

Validation

Actual performance of these survey components was judged by the following criteria: (1) Respondents' comments on the questionnaires, (2) interview response and refusal rates, (3) relation of selected response variables to interviewer and contact variables, (4) comparison of sample with population characteristics, and (5) interviewers' comments on respondents' definitions of the interview situation.

Respondents' comments on the survey (as described by the interviewers in Appendix D) reveal much information helpful to the analysis of response to individual items, and to revision of the questionnaire for subsequent studies. These comments, however, do not indicate that respondents found the questionnaire generally unacceptable or difficult to answer; in only 9 of the 104 interviews was the respondent's understanding of the questionnaire "poor," as judged by the interviewer.

Response and refusal rates, and length of interviews strengthen this impression. Of 105 households actually contacted, only one refused to cooperate in the survey, and no interview, once started, failed of completion. Length of interviews ranged from approximately 15 to 45 minutes; 71, or nearly three-fourths, lasted from 19 to 24 minutes, while only 12 lasted over a half-hour. These figures again serve to strengthen the impression that the interview situation and the survey instrument were easily accepted and understood by respondents.

Lack of systematic bias in sample composition is indicated by a no-contact rate of 13 percent together with the nature of the reasons for no-contact, analyzed in Table 1.

Table 1. REASONS FOR NO-CONTACT OF HOUSEHOLDS IN SAMPLE

Reason	Number of no-contacts
Refusals	1
Illness	2
Out of town on vacation	4
Unable to contact, 2 or more call backs	9
Total	16

It is difficult to compare the sample with population characteristics, because 1960 census figures on household heads and their spouses are not available for Clarkston. In the absence of such data, figures pertaining to the general population of Clarkston were used. Table 2 compares the proportions of men and women respondents in the survey to the same age - sex groupings found in the general Clarkston population. These figures show that compared to the general population, the sample

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Table 2. AGE-SEX CHARACTERISTICS OF SAMPLE COMPARED TO CLARKSTON POPULATION 20 YEARS OF AGE OR OLDER[a]

Sex	Age, yr	Number in sample	Proportion of sample, %	Proportion of Clarkston population, %
Males	20-34	12	25	23
	35-49	21	45	29
	50-64	5	11	22
	65 and over	9	19	26
	Total	47	100	100
Females	20-34	20	35	23
	35-49	20	35	25
	50-64	8	14	22
	65 and over	9	16	30
	Total	57	100	100

[a] Source: U. S. Census Bureau: General Population Characteristics: Washington - 1960. 49-49.

over-represents both men and women in the 20- to 49-year bracket and under-represents those of 50+ years. This discrepancy is entirely consistent with the nature of the sampled population, however, because of the tendency of older persons to be dependents rather than household heads or their spouses.

Since, with reference to the general Clarkston population, the sample under-represents older persons, by the same token it over-represents high school graduates and under-represents persons with 11 years of education or less. Table 3 details this comparison.

A third comparison by occupation of household head (Table 4) shows that the sample over-represents households whose heads are in clerical or skilled labor occupations and under-represents those with heads in the other occupational categories of labor and service positions; it includes a nearly identical proportion of household heads in professional or managerial positions.

Again, this discrepancy can be referred to expected differences between the sampling and the general Clarkston adult populations. Because of the younger age and higher education of household heads and spouses compared to the general adult population, one would expect

Table 3. EDUCATION OF RESPONDENTS COMPARED WITH CLARKSTON POPULATION 25 YEARS OR OLDER

Education, yr	Respondents in sample[a]	Sample proportion, %	Population proportion, %
11 or less	33	34	55
12	45	47	26
13 or more	18	19	19
Total	96	100	100

[a] Eight respondents were less than 25 years of age.

Table 4. OCCUPATIONAL DISTRIBUTION OF HEADS OF HOUSEHOLDS IN SAMPLE COMPARED TO CLARKSTON MALE POPULATION

Occupation	Male population,[a] %	Heads of household, %
Professional, technical	9	7
Farm owners	3	2
Managers, officials, proprietors, non-farm	16	18
sub-total	28	27
Clerical, sales	13	18
Craftsmen, foremen	20	24
sub-total	33	42
Machine operators	25	13
Service workers	5	8
Laborers, including farm and mine	9	9
sub-total	39	30
Totals	100	99[b]

[a] Proportions are to base, persons in labor market only.

[b] One respondent listed multiple occupations.

to find in a sample of household heads and their spouses a disproportionately large number in occupational categories above semi-skilled and service. Also, a certain proportion of household heads are women: Such household heads made up 13 percent of the sample. One would expect their occupational distribution to differ from that of men in the general population in that a larger proportion would be in clerical jobs.

In short, when compared to the general adult population of Clarkston, the sample is disproportionately younger and contains a proportionate number of persons with 13 or more years of education, but a disproportionately small number whose education stopped before high school graduation; compared to the male working population of Clarkston, it contains a proportionate number in professional and managerial positions, but a disproportionately small number in labor and service occupations, balanced by a disproportionately large number in clerical, supervisory, and skilled labor categories. Both identities and discrepancies are consistent with proportions to be expected in a sample of household heads and their spouses; they do, however, indicate precautions that should be observed in any interpolation of survey findings to the general Clarkston population.

INTERVIEW SITUATION AS POTENTIAL SOURCE OF SURVEY BIAS

In addition to the factors of sample selection and composition, the interview situation itself constitutes a major potential source of systematic bias in response to a questionnaire. We have outlined some of the steps that were taken through interviewer selection and training to ensure that the interview would have a negligible influence on the respondent's own definition of the existence, salience, and seriousness of air pollution in Clarkston. One of these steps was to attempt to structure the interview situation initially in terms of Clarkston health problems in general, rather than air pollution in particular.

To what extent was this initial structuring accepted by persons interviewed? A month and a half after completion of the survey, the interviewers were asked for information concerning (a) the extent to which subjects responded to the interviewer's initial structuring of the situation with expressions of belief that the interview was really going to concern itself with air pollution; (b) what, if anything, interviewers did to restructure the interview situation in that event; (c) what effect, if any, these restructuring efforts seemed to have upon subjects' definitions of the interview situation.

Interviewers' comments on these three points appear verbatim in Appendix E. On the whole, the attempt to focus interviews initially on general health problems of Clarkston proved successful.

Another potential source of response bias inherent in the interview situation is day of interview. Interviewers made house-to-house visits over a 6-day period: May 20-25. They completed 1 interview on the 20th, 8 on the 21st, 37 on the 22nd, 39 on the 23rd, 18 on the 24th, and 1 on the 25th. One might reasonably expect that in a city the size of Clarkston (6,600) word of the survey and of its central topic would circulate fairly rapidly, so that persons interviewed on the 23rd and subsequent days might define the interview situation differently from those interviewed on the 22nd or before. To test this supposition, we compared Table 5 responses to questionnaire Item 3A ("Are there some things you don't like about living in Clarkston"), made by respondents interviewed on the 20th, 21st, and 22nd of May with those interviewed on the 23rd, 24th, and 25th, to see if more of the latter than of the former brought up air pollution spontaneously as a disadvantage. Since almost identical proportions of subjects from the two survey periods gave this response (30 percent and 34 percent), (Chi square not significant at the 95 percent level), we concluded that no significant systematic distortion of respondents' definition of the interview situation occurred over the 6-day period.

Table 5. RESPONDENTS' SPONTANEOUS MENTION OF AIR POLLUTION AS CLARKSTON DISADVANTAGE (ITEM 3A)[a] (N)

Spontaneous mention of air pollution as disadvantage	Day of interview		Interviewer			
	20th,21st,22nd	23rd,24th,25th	1	2	3	4
Yes	14	20	9	14	6	5
No	32	38	13	16	18	23
Total	46	58	22	30	24	28

[a] Statistical analysis – chi square not significant.

Interviewer variability represents still another source of systematic response bias. Since assignment of respondents to interviewers was random, statistically significant differences in response rates between groups of subjects contacted by each interviewer could reasonably be attributed to this factor. Tables 5 and 6 show that variations in subjects' response by interviewer to two key items, 3A ("Are there some things you don't like about living in Clarkston") and 9c ("How would you rate air pollution for Clarkston today in terms of serious, somewhat serious, or not serious") are below the level set for statistical significance (i.e., have greater than a .05 probability of occurrence through chance).

Table 6. RESPONDENTS' RATING OF SERIOUSNESS OF AIR POLLUTION FOR CLARKSTON (ITEM 9c)[a] (N)

Air pollution rating	Interviewer			
	1	2	3	4
Serious	5	8	8	4
Somewhat serious	12	14	11	12
Not serious	5	7	3	9
Other, don't know	0	1	2	3
Total	22	30	24	28

[a] Statistical analysis – chi square not significant.

A final potential source of distortion of the interview situation is a newspaper account of the proposed study that appeared in the Lewiston Tribune on March 6 (see Appendix F). To see to what extent this report influenced respondents' definition of the interview situation and of the public opinion survey more generally, the closing item on the questionnaire (Item 23) asked: "Have you read or seen anything in the newspapers recently about air pollution?" In reply, 70 percent of the sample said "No"; of those who answered "Yes," only 5 stated that they had seen a reference to the public opinion survey of air pollution in Clarkston. The newspaper report, therefore, may be considered of negligible influence upon respondents' definition of the public opinion survey and of the interview situation.

In sum, the criteria we used for judging field performance of the three major survey components (the questionnaire, the interview, and the sample) indicate that these components succeeded reasonably well in providing an instrumentally undistorted report, free from systematic sampling bias, of respondents' opinions on the survey topic.

SURVEY FINDINGS

Awareness and Concern

Our findings are discussed on two levels: data on respondents' definitions are presented by marginal frequency and scalogram pattern to gain an overall picture of the sample and population response to the survey; and the overall response is analyzed by selected demographic and socio-economic characteristics of respondents to attempt to provide explanatory hypotheses for that response. Since the primary objective of the study was to determine the proportion of the sampled population that was disturbed by air pollution in Clarkston, some specifications of the concept "disturbance" must be provided. We analyzed it according to two dimensions of variation: awareness, and severity. Conceived on the dimension of awareness alone, disturbance involves no more than whatever sensory adjustments may be required for an individual to consciously take account of or cognitively recognize a phenomenon. By itself, awareness does not imply any judgments or feelings about this phenomenon, although the reverse of course does not hold.

Conceived on the dimension of severity, disturbance involves feelings of annoyance with or concern about a phenomenon at varying degrees of strength. In the survey, these feelings of annoyance or concern are further analyzed into severity of air pollution as a personal problem, and severity of air pollution as a community problem, in the definition of respondents.

AWARENESS OF AIR POLLUTION IN CLARKSTON

Two measures serve as indices of awareness: first, a measure of personal awareness of air pollution in Clarkston; second, a measure of air pollution in Clarkston attributed by the respondents to "others" in the community.

Replies to item 11, "Do you think there is air pollution in Clarkston at any time during the year," constitute the first measure: 81 respondents replied "Yes"; 22 "No"; and one, "Not applicable because respondent has not lived long enough in the area." In other words, 79 percent (71-87)* of the respondents who had lived in Clarkston for at least a year indicated they had some awareness of the existence of air pollution in that city.

To check the extent of this awareness and to gain some idea of its cognitive dimensions, interviewers asked the projective type question: "What do you think the words 'air pollution' mean to most people in this area?" (Item 20). This question is called "projective" on the theory that it affords the respondent an opportunity to project his own definitions of a situation to some relatively neutral, undefined object -- e.g., "most people," thus circumventing restraints he may feel about expressing his own opinions directly. Table 7 shows the fixed answers of respondents to question 20.

One may infer from this table that respondents perceive air pollution in Clarkston primarily as an odor problem (91 percent "Yes" - 20a); secondarily as a problem of visibility (74 percent "Yes" - 20c); thirdly as a problem of nose or throat irritation (62 percent "Yes" - 20e); while a minority perceives it as frequent irritation of eyes (40

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* Figures in parentheses following a sample proportion (e.g. 79%), refer to estimated upper and lower limits of that proportion in the sampling population (Clarkston household heads and their spouses), at the 95 percent level of confidence. Appendix H, prepared by the Research Triangle Institute, details the calculation procedures for these confidence limits.

Table 7. RESPONSES TO ITEM 20, "WHAT DO YOU THINK THE WORDS 'AIR POLLUTION' MEAN TO MOST PEOPLE IN THIS AREA?"

Choices	Number of responses				No response	% of respondents answering "yes"	95% confidence limits "yes."
	Yes	No	Don't know	Other			
Frequent bad smells in the air	95	8	1	0	0	91	85-97
Too much dust and dirt in the air	28	70	6	0	0	27	17-36
Frequent haze or fog in the air	77	23	4	0	0	74	62-86
Frequent irritation of the eyes	42	53	7	2	0	40	31-50
Frequent nose or throat irritation	64	33	6	1	0	62	55-68
Other	19	0	0	0	85		

percent "Yes" - 20d); and as dustfall (27 percent "Yes" - 20b).

A second inference is that more people may be aware of the existence of frequent bad smells in Clarkston air than of air pollution -- 91 percent as against 79 percent. At the very least, we can say that although 21 percent of the sample reported air pollution non-existent in Clarkston, only 9 percent said "most people in the Clarkston area" would fail to associate "frequent bad smells" with the words "air pollution."

A third inference is that to respondents the five listed dimensions of air pollution stand in a systematic rather than random relationship to one another, and that the model for this relationship is given by a Guttman scale.[8] To the degree this inference is correct, the responses of respondents to these five items fall into one or another of the six patterns (called perfect scale types) shown in Table 8.

Existence of such a systematic relationship between these five dimensions of air pollution implies further that the significance (meaning) of air pollution to Clarkston residents represents a response to some factor or complex of factors in their environment that operates in a systematic way upon them all, rather than a response to factors idiosyncratic or randomly variable in their effect upon Clarkston residents. No attempt is made here to specify the nature of this factor or complex of factors, but only to give examples of what it might be. Con-

Table 8. PATTERN OF AIR POLLUTION RESPONSE BY CLARKSTON RESIDENTS

Dust in air	Eye irritation	Nose irritation	Haze, fog	Bad smells	Perfect scale type
+[a]	+	+	+	+	5
-[b]	+	+	+	+	4
-	-	+	+	+	3
-	-	-	+	+	2
-	-	-	-	+	1
-	-	-	-	-	0

[a] + means "Yes."

[b] - means "No."

Table 9. PERCENT RESPONSE TO FIVE DIMENSIONS OF AIR POLLUTION

Perfect scale pattern	% respondents
5	11.5
4	17.3
3	14.4
2	15.3
1	12.5
0	0.9
Total	71.9

sensus of opinion among Clarkston residents as to the meaning of air pollution would be one possibility; monotonically increasing sensitivity, cultural or physiological in origin, to contaminants actually present in Clarkston ambient air would be another.

To test the inference of scalability on the Guttman model among these five dimensions of air pollution, the response patterns to them were worked out from the survey data (Table 9).[9]

Seventy-two percent of respondents fall into one or another of the six perfect scale types; 45 of these 75 or 60 percent fall into types 3, 4, and 5 -- i.e., to most people in the Clarkston area air pollution means at least frequent nose and throat irritation; frequent haze or fog in the air; and frequent bad smells in the air. Only one person (0.9 percent of the entire sample) said that the words "air pollution" meant none of the phenomena listed in item 20 to most people in the Clarkston area.

To further test the inference of scalability of the five listed dimensions of air pollution, Table 10 presents the entire array of response patterns to item 20 given by the respondents, with errors (i.e., responses that do not conform to the hypothesized scale pattern) circled. Examination of this array discloses that the largest number of errors, 12, occurs in response to item (20b) - "Too much dirt and dust in the air;" the next largest, 9, to item 20c - "Frequent haze or fog in the air;" while the 3 remaining items contribute only 10 errors in all. These facts indicate that to this sample of respondents eye irritation, nose-throat irritation, and malodors stand in a more consistent or systematic relationship with each other as dimensions of air pollution than they do with the dimensions of low visibility and dustfall. Furthermore, the low frequency of association of air pollution with dustfall (27 percent "Yes" to 20b), coupled with the fact that 11 percent of responses to the dustfall item are discrepant by Guttman scale criteria, lead to the inference that the response to air pollution as dustfall is a relatively idiosyncratic one among Clarkston residents, or is a response to some factor that operates selectively on some respondents but not on others. The section of this report that analyzes responses to the questionnaire by north-south residential location of respondents discusses this possibility further.

Nevertheless, when the non-scale response patterns are converted to scale patterns by the conventional least-error technique, and error frequencies are related to total response possibilities, the five items, even including 20b on dustfall, form an acceptable Guttman Scale by the criterion of reproducibility, the coefficient for which is 0.94 (i.e., given the scale type of a respondent, his actual responses to each of the five items of the scale could be predicted, or reproduced accurately, 94 times out of a hundred). The distribution of the entire sample among the six possible scale types, both perfect and imperfect, is shown in Table 11.

We may conclude from this analysis that although 20 percent of the respondents claimed air pollution does not exist in Clarkston, the term "air pollution" does represent a well-structured concept to most Clarkston residents; and that the most salient features of this concept are malodors, low visibility, and nose-throat irritation.

SEVERITY OF AIR POLLUTION AS A PERSONAL PROBLEM

A number of items in the questionnaire were designed specifically to gauge the extent of respondents' personal annoyance with air pollution. The first of these concerns the nature of the disadvantages of Clarkston as a place to live (Item 3).

Since most persons are reluctant to criticize their home communities to persons they have never seen before (such as opinionnaire interviewers), respondents were first given an opportunity to express their satisfactions with Clarkston as a place to live. In their replies to Items 1 and 2, 85 percent said Clarkston was an "excellent" or

Table 10. GUTTMAN SCALE (b): COGNITIVE DIMENSIONS OF AIR POLLUTION BASED ON RESPONSES TO ITEM 20: "WHAT DO YOU THINK THE WORDS 'AIR POLLUTION' MEAN TO MOST PEOPLE IN THIS AREA?" [RESPONSES DICHOTOMIZED: DIGIT 1 (YES) VS. 2 (NO), 3(DON'T KNOW), 4 (OTHER)][a]

Frequency of Response Patterns						
Too much dust and dirt in air	Frequent irritation of eyes	Frequent nose or throat irritation	Frequent haze or fog in air	Frequent bad smells in air	Number	Scale Type
+	+	+	+	+	12	5 perfect
+	+	+	(-)	+	4	5 imperfect
-	+	+	+	+	18	4 perfect
-	+	+	(-)	+	1	4 imperfect
-	+	+	+	(-)	3	4 imperfect
-	-	+	+	+	15	3 perfect
-	-	+	(-)	+	3	3 imperfect
-	-	+	+	(-)	1	3 imperfect
(+)	-	+	+	+	5	3 imperfect
(+)	-	+	(-)	+	1	3 imperfect
-	-	-	+	+	16	2 perfect
-	(+)	-	+	+	2	2 imperfect
(+)	-	-	+	+	4	2 imperfect
(+)	-	-	+	(-)	1	2 imperfect
-	-	-	-	+	13	1 perfect
(+)	-	-	-	+	1	1 imperfect
-	-	-	-	-	1	0 perfect
-	-	(+)	-	-	1	0 imperfect
-	(+)	-	-	-	2	0 imperfect
					Total 104	
Frequency of Error by Item:						
12	4	1	9	5		

[a] (Coefficient of Reproducibility: 0.94).

Table 11. DISTRIBUTION OF RESPONDENTS BY SCALE TYPE

Scale type perfect and imperfect		Number of respondents	% respondents
5		16	15.3
4		22	21.2
3		25	24.1
2		23	22.2
1		14	13.4
0		4	3.8
	Total	104	100.0

"good" place to live; 10 percent claimed it was "fair"; and only 4 percent answered it was "poor" or "very poor" (one subject gave no response.)* When asked, "What are some of the things you like about living in Clarkston", only six were unable to specify some reason for liking their community. Of the remaining 98 subjects, 38 mentioned first some attribute of the community (e.g., good schools, small size, churches, parks, good government, nice physical appearance). An almost equal number, 35, mentioned first the climate or weather of Clarkston, as an advantage. Of the remaining subjects, 18 listed first some attribute of the people in the community (e.g., their friendliness or neighborliness), 3 mentioned recreational opportunities, 4 gave advantages not classified under any of the above categories. Taking account of advantages in addition to those mentioned first by respondents (i.e., second and third mentions), the picture of Clarkston as a "good community" in the opinion of this sample becomes even clearer. Of the 188 Clarkston advantages that respondents mentioned spontaneously, 71 or 38 percent concerned community attributes. Climate and weather remains in second place as an advantage with 26 percent of total mentions; 22 percent of the mentions concern attributes of the people in Clarkston.

Against this background of community satisfaction, when interviewers asked respondents, "Are there some things" or "What are some of the things" (depending upon their answer to item 1) "you don't like about living in Clarkston" (Item 3A), one-third of the respondents listed spontaneously a disadvantage explicitly related to air pollution. Of these, 23 referred to malodors (e.g., "smells," "bad smells," "stinks"); 4 to low visibility (e.g., "haze," "smog," "smoke"); 5 to some unspecified aspect of air pollution (e.g., "bad" or "poor" air); and 2 listed multiple aspects of air pollution. Twenty-four respondents spontaneously mentioned "the mill" as a source of malodors, while nine did not specify any source of pollution.

Because of the significance customarily attached to spontaneous mentions of air pollution as a disadvantage or source of annoyance (cf. "A spontaneous, or voluntary response that air pollution bothered the respondent was regarded as serious," p. 10, reference 1), we analyzed such mentions further by respondents' expressed degree of satisfaction with Clarkston as a place to live, and by disadvantages of Clarkston other than those explicitly related to air pollution. Results of this analysis appear in Table 12.

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* Respective confidence limits are given in Appendix H, Characteristic 1.

Table 12. RESPONDENTS' RATING OF CLARKSTON AS A PLACE TO LIVE

	Excellent	Good	Fair, Poor, Very Poor
Mention air pollution only as disadvantage	8	10	4
Mention only some disadvantage other than air pollution	6	24	7
Mention air pollution and some other disadvantage	1	9	2
Do not list any disadvantage	12	18	2
Totals	27	61	15

Table 12 shows that the proportion of respondents who list "no disadvantages" varies directly with their rating of Clarkston; 44 percent among those who rate Clarkston "excellent," 30 percent among those who rate it "good," and 13 percent who rate Clarkston "fair," "poor," or "very poor," list no disadvantages to living there.

This table also shows that a somewhat higher percentage of those who rate Clarkston fair, poor, or very poor, mention air pollution spontaneously as a community disadvantage, than the percentage in the other two rating groups: 40 percent compared to approximately a third among those who rate Clarkston excellent or good.

Of greater significance, however, is that the ratio of persons who spontaneously mention only air pollution as a Clarkston disadvantage to respondents who spontaneously mention some other disadvantage either alone or in combination with air pollution is much higher among those who rate Clarkston excellent, than among those who rate it good or fair, etc.: 114 percent compared to 33 and 44 percent, respectively. This finding requires replication on much larger samples before any firm conclusions can be drawn. It indicates, however, that persons who are highly identified with their community in the sense that they express high satisfaction with it as a place to live may think of air pollution as a salient source of annoyance or disturbance, while persons less strongly tied to their community may think of it as only one of a complex of disadvantages they sense with community living. On the other hand, this analysis points up the need to distinguish the salience of a phenomenon from its severity as a source of personal disturbance. Air pollution may be more salient as a source of disturbance to people who rate their community an excellent place to live than to people who rate it as only good, fair, or poor, in the sense that air pollution is the only disadvantage such persons may openly associate with that community. This does not necessarily mean, however, that air pollution is a more severe source of disturbance to them than to persons who are less identified with the community in the sense that they feel there is a greater need to do something about it.

A second, more straightforward index of the severity of air pollution as a personal problem to respondents derives from their answers to Item 13 of the questionnaire (see Table 13).

Table 13. **RESPONSES TO ITEM 13: "WHICH ONE OF THESE STATEMENTS APPLIES TO YOU?"**

Since living in Clarkston	Number who chose statement	Percent who chose statement
I have not been bothered by air pollution	14	13
I have been somewhat bothered by air pollution	52	51
I have been bothered quite a lot by air pollution	14	13
Other	1	1
No response	0	0
Not applicable (Answer to Item 11, air pollution in Clarkston was "no")	23	22
Total	104	100

The percentage of Clarkston residents somewhat bothered or bothered quite a lot by air pollution is almost exactly the same as the percentage of Los Angeles County residents who said they were bothered by air pollution in 1956 (approximately two-thirds). To provide some trend reference to respondents' annoyance with air pollution, they were asked (Item 13A): "Has air pollution bothered you more, about the same, or less each year?" Of the 66 who said they were bothered by air pollution, 50 or 75 percent answered "same" and "more." 11 or 16 percent replied "less," while 6 persons said they were unable to respond to the question because they had not lived long enough in Clarkston. (For confidence limits to these proportions, see Appendix H, Characteristics 13 (1), and 13 (1)A.)

As a final index of severity of air pollution as a personal problem, Items 17 and 18 asked, "Do you worry about the effects of air pollution on your (health) (property)?" Table 14 shows that worries over the effects of air pollution on property are somewhat more prevalent than worries over its health effects (26, health; 33, property). The extent of worry in both cases is underestimated if one takes account only of respondents who answered "Yes" to these items. Four respondents said they didn't worry about health effects of air pollution because "it wouldn't do any good," while six said they did not worry about property effects of air pollution "since they had painted their houses."

Table 14. RESPONSES TO ITEMS 17 AND 18: "DO YOU WORRY ABOUT THE EFFECTS OF AIR POLLUTION ON YOUR (HEALTH) (PROPERTY)?"

	Health		Property	
Response	Number	Percent	Number	Percent
Yes	26	25	33	32
No	51	50	42	41
Other	4	3	6	5
No response	0	0	0	0
No air pollution in Clarkston	23	22	23	22
Totals	104	100	104	100

SEVERITY OF AIR POLLUTION AS A COMMUNITY PROBLEM

Although the feeling that a phenomenon constitutes a source of personal annoyance may be closely related to the feeling that it disturbs people in the community more generally (i.e., constitutes a community problem), the two types of feelings are logically distinct. The present survey was designed to probe the extent to which Clarkston residents regarded air pollution as a community problem in three ways: By relating community problems to the context of health; by asking directly about the status of air pollution as a community problem; and by asking whether significant situation-definers in Clarkston regarded air pollution as a community problem.

Prior to explicit mention of air pollution in the interview, respondents were asked (Item 6): "Do you believe Clarkston has any health problems that need correction?" If they answered affirmatively, the interviewer asked, "what problems?" Of the 104 respondents, 36 answered "Yes" to the first question; 61 said "No"; and 7 were undecided. (For Confidence limits, see Appendix H, Characteristics 6 (1).) Table 15 details the sources of the health problems first mentioned in the 36 affirmative responses.

Table 15. DELINEATION OF SOURCES OF HEALTH PROBLEMS BY RESPONDENTS

Sources of health problem	No. of respondents
Pulp mill	13
Water	8
Air (general reference to air pollution)	3
Garbage dump	2
Animals, houses, stockyard	2
Miscellaneous (alleys, slums, restaurants, other)	8
Total	36

No detailed information is available as to the nature of the health problems that respondents associated with these various sources. If we assume that the pulp mill and garbage dump are sources of air pollution, air pollution accounts for 50 percent of the conditions mentioned spontaneously by respondents as health hazards in Clarkston.

Item 9 of the questionnaire is the first question asked respondents that is concerned explicity with air pollution. The questions and respondents' answers appear in Table 16. These data speak for themselves, so far as respondents' opinions of the relative seriousness of air pollution as a Clarkston community problem is concerned. Comparable figures are available from surveys made in Buffalo, N. Y., 1958 and 1962.[2, 3] These indicate even more clearly the significance of the concern that Clarkston residents express over the quality of their air supply. When a randomly selected sample of Buffalo residents was asked in 1958 to rate the seriousness of air pollution as a community problem in the context of a list of nine other problems, 35 percent called it very serious or somewhat serious. In a telephone survey of another randomly selected sample of Buffalo residents made in the spring of 1962 approximately 45 percent rated air pollution a serious community problem. By contrast, in the Clarkston survey seven out of ten (72%) respondents called air pollution a serious or somewhat serious problem for their community.

Table 16. RESPONSES TO ITEM 9: "HERE ARE A FEW PROBLEMS WHICH DIFFERENT COMMUNITIES ARE FACING. HOW WOULD YOU RATE EACH OF THESE FOR CLARKSTON TODAY IN TERMS OF SERIOUS, SOMEWHAT SERIOUS, OR NOT SERIOUS?"

Problem	Percent of respondents who rate problem:				
	Serious	Somewhat serious	Not serious	Don't know	Total
Outbreaks of contagious diseases, such as whooping cough, diptheria	2.5	2	88	7.5	100
Water pollution	4	19	72	5	100
Air pollution	24	47	23	6	100
95% confidence limits, air pollution	14-34	36-58	17-29	..	..

As a check on this figure and to provide some indication of the trend differentials that it might conceal interviewers asked, "Which one of these statements do you think best describes the situation in this area in recent years?" (Item 21). The distribution of respondents by the four responses provided is shown in Table 17.

These figures show that the percentage of respondents who selected a response other than (a) ("Air pollution has not been a serious problem for this area") is virtually the same as the percentage that called air pollution a serious or somewhat serious community problem in response to item 9: 70 percent versus 72 percent. This result provides added support for the statement that 7 out of 10 members of the sample of Clarkston household heads and spouses regard air pollution with some degree of seriousness as a community problem. This result also shows that of those who regard it as a problem, approximately one-third think air pollution has grown less serious, and two-thirds that it has become more serious or been continuously serious each year.

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Table 17. **RESPONSE TO ITEM 21 BY CLARKSTON RESIDENTS INTERVIEWED**

Response	% of total sample who selected response
(a) Air pollution has not been a serious problem for this area	24
(b) Air pollution has become a more serious problem each year for this area	25
(c) Air pollution has become a less serious problem each year for this area	19
(d) Air pollution has continuously been a serious problem for this area	26
(e) Other, no response, has not lived long enough in the area	6

Another index of the seriousness of air pollution as a community problem to Clarkston residents comes from responses to item 19: "How do you think (local doctors) (local papers) (major local industries) feel about air pollution in this area?" This item was intended to provide information, first, on the degree to which Clarkston residents regard significant situation-definers as holding well-defined positions respecting air pollution; and second, to gauge the extent to which residents regard these positions as over- or under-estimations of the seriousness of air pollution in their community.

Table 18 discloses that nearly half the respondents said they don't know how seriously local doctors regard air pollution as a community problem for Clarkston; nearly the same proportion was unclear as to the newspaper's position on air pollution, despite the seeming abundance of reports on the subject carried by the Lewiston Tribune (see Appendix G). Only about 25 percent of the sample, however, said they were unclear about the position on air pollution taken by major local industries.

An examination of the positions themselves shows discrepancies between the seriousness of air pollution that respondents express and that which they impute to these significant situation definers: For example, 7 out of 10 Clarkston residents say that major local industries regard air pollution as non-existent or not serious, although only 3 out of 10 express this belief themselves. Clearly, respondents generally do not impute alarmist opinions on the subject of air pollution to their doctors, their newspaper, and especially, to their major local industries.

Table 18. **RESPONSES TO ITEM 19: "HOW DO YOU THINK (LOCAL DOCTORS) (LOCAL PAPERS) (MAJOR LOCAL INDUSTRIES) FEEL ABOUT AIR POLLUTION IN THIS AREA?"**

Response	Local doctors		Local papers		Major local industries	
	Percent sample	95% confidence limits	Percent sample	95% confidence limits	Percent sample	95% confidence limits
There is no air pollution in area	4	0-8	10	17-28	17	9-24
There is air pollution, but it is not a serious problem	31	20-42	30	16-44	51	40-63
Air pollution is a serious problem here	18	13-24	13	8-19	6	2-10
Don't know	45	31-58	40	29-50	23	16-31
Other, no answers	2	--	7	--	3	--

COMBINED INDEX, SERIOUSNESS OF AIR POLLUTION AS PERSONAL AND AS COMMUNITY PROBLEM (GUTTMAN SCALE (a))

The previous sections have attempted to gauge the extent of disturbance caused by air pollution along three separate continua: Awareness of air pollution; feelings of annoyance or disturbance over effects of air pollution experienced, or thought to be experienced, personally; and feelings of concern over air pollution defined as a community problem. The present section attempts to combine measurements along these three continua into a single index, to provide a summary estimate of the proportion of the population that is disturbed by air pollution. As in the section on "Awareness of Air Pollution in Clarkston," the approach to construction of such an index proceeds through Guttman scale analysis.

Four items serve as a basis for this analysis: Items 3A, 11, 13, and 21 of the questionnaire. Each contributes a different component to the combined index: 3A, spontaneous mention of air pollution as a disadvantage -- the component of salience of awareness, and perhaps severity of personal disturbance; 11, belief or disbelief in existence of air pollution in Clarkston -- the element of awareness, as such; 13, extent to which bothered by air pollution -- the element of personal disturbance; 21, is air pollution now, or has it become, a problem, -- the element of community concern.

To facilitate analysis, responses to these four items were dichotomized according to whether or not they indicated awareness or concern with air pollution. This dichotomization and the resulting distribution of responses appear in Table 19 by frequency of responses indicating awareness or concern.

Table 19. **DISTRIBUTION OF RESPONSES ACCORDING TO AWARENESS**

Item	Responses Indicating Awareness or Concern With Air Pollution	No. of Respondents	Responses Indicating Absence of Awareness or Concern With Air Pollution	No. of Respondents
3A	All spontaneous mention of air pollution as a "disadvantage"	34	No spontaneous mention, air pollution as a "disadvantage"	70
21	Air pollution has continuously been a serious problem for this area; air pollution has become a more serious problem each year for this area	53	Air pollution has not been a serious problem; air pollution has become a less serious problem each year, for this area	45
13	I have been somewhat bothered; I have been bothered quite a lot, by air pollution	66	I have not been bothered by air pollution	37
11	Yes (i.e. air pollution exists in Clarkston)	81	No (i.e. air pollution does not exist in Clarkston)	22

This ordering of items generates the response patterns on the hypothesis of perfect scalability shown in Table 20.

Table 20. RESPONSE PATTERNS BASED ON PERFECT SCALABILITY

Item No.				"Perfect" Scale Type
3A	21	13	11	
+[a]	+	+	+	4
–[b]	+	+	+	3
–	–	+	+	2
–	–	–	+	1
–	–	–	–	0

[a] + indicates awareness or concern.

[b] – indicates lack of awareness or concern.

Responses from eight subjects had to be excluded from the scale analysis because they answered "other" or "have not lived long enough in the area" to one or more of the four items. Of the 96 remaining subjects, 80 or 83 percent gave responses that fell into one of the five perfect scale types. Table 21 presents the total array of actual response patterns, both "perfect" and "imperfect," together with the distribution of respondents among them. The coefficient of reproducibility calculated from this array is 0.96, well above 0.90, the conventionally established lower limit for accepting the hypothesis of scalability. Table 21 shows that the largest number of errors (i.e., responses that do not conform to the hypothesized pattern), 9, occurred in response to item 3A, spontaneous mention of air pollution as a disadvantage. This fact provides additional justification for the view that such mentions may be overrated as estimates of the seriousness of air pollution: for over a fourth (9) of the 34 who mentioned some aspect of air pollution spontaneously as a disadvantage to living in Clarkston in answer to item 21 said that air pollution either was not a serious problem for Clarkston or was becoming a less serious problem each year in that area. Guttman Scale (a), however, provides possibly the best single index of the proportion of Clarkston residents that is disturbed by air pollution. According to the distribution, 20, or a fifth of the scalable subjects, fall in Scale Type 0; they show no, or practically no, awareness and concern with air pollution in Clarkston. By contrast, 76, or four-fifths of the scalable subjects are disturbed to some degree by air pollution in Clarkston. For the 12 subjects in Type 1, the level of such disturbance may be regarded as low; for the 18 in Type 2, moderate; while the 46 subjects in Types 3 and 4 can be called very concerned or greatly disturbed by air pollution in Clarkston. Table 22 summarizes these conclusions.

Table 21. GUTTMAN SCALE (a): SERIOUSNESS OF AIR POLLUTION AS PERSONAL AND COMMUNITY PROBLEM[a]

Frequency of response patterns to items 3a, 21, 13, and 11

Spontaneous mention of air pollution as disadvantage	Air pollution has become or is continuously a serious problem	Bothered "somewhat" or "quite a lot" by air pollution	Air pollution in Clarkston?	Number	Scale type	
+	+	+	+	21	4	perfect
+	+	(−)	+	1	4	imperfect
−	+	+	+	24	3	perfect
−	−	+	+	10	2	perfect
(+)	−	+	+	8	2	imperfect
−	−	−	+	8	1	perfect
−	(+)	−	+	4	1	imperfect
−	−	−	−	17	0	perfect
−	(+)	−	−	2	0	imperfect
(+)	−	−	−	1	0	imperfect
				Total 96		

Frequency of error by item:

9	6	1	0	

[a] (Coefficient of reproducibility 0.96).

Table 22. PERCENTAGES OF SCALABLE SAMPLE AND OF SAMPLED POPULATION THAT ARE DISTURBED BY AIR POLLUTION IN CLARKSTON: BASED ON GUTTMAN SCALE (a)

Degree of disturbance	Percent of scalable sample (number 96)	Limits of proportions disturbed by air pollution in sampling population, at 95% confidence level[a]
None	21	Between 14 and 30%
Low to Moderate	31	Between 22 and 41%
High	48	Between 38 and 58%
Low-High	79	Between 70 and 86%

[a] Based on binomial distribution.

Sources and Action

SOURCES OF AIR POLLUTION

Although respondents differ in the degree to which they are disturbed by air pollution in Clarkston, they show virtual unanimity in defining the Potlatch Forests mill as the prime source of such pollution. Three lines of evidence support this conclusion:

First, all 34 respondents who spontaneously mentioned air pollution as a Clarkston disadvantage and who specified a source, mentioned "the mill" and only the mill as the point of origin. A typical response to the question, "Are there some things you don't like about living in Clarkston?" was: "The smell of the pulp mill."

Second, 26 of the 34 respondents who had lived in Clarkston in 1950 or before and who said air pollution existed there answered the question, "When did you first notice air pollution in Clarkston?" by saying, "When the mill started." Four gave a date between 1951 and the present; only two gave a date of 1950 or before; one said he did not remember.

Third, in answer to the question, "What do you think are the major sources of air pollution in this area?" (Item 15) 75 of the 81 subjects (92%) who showed awareness of such pollution (i.e., answered yes to item 11)mentioned the mill as the first source; two said automotive vehicles; one, the dump; and one, the stockyard. Table 23 presents the complete array of responses.

Table 23. RESPONSES TO ITEM 15: "WHAT DO YOU THINK ARE THE MAJOR SOURCES OF AIR POLLUTION IN THIS AREA?" (OPEN-END ANSWERS)

Source	Number 1st mention	Number 2d mention	Number 3d mention	Total mentions
Automotive vehicles	2	8	2	12
Mill, pulp mill	75	3	0	78
Home trash burners, chimneys	0	5	1	6
City dump	1	5	0	6
Stockyard	1	1	0	2
Packing plant	0	3	3	6
Other	1	2	0	3
Don't know	1	0	0	1
No response	0	0	0	0
Totals	81	27	6	114

ACTIONS TAKEN OR RECOMMENDED

From the foregoing sections, there emerges the outline of a problem situation that is disturbing in some degree to four-fifths of the respondents, and by inference, to between 70 and 86 percent of household heads and their spouses in Clarkston: namely, the problem of air pollution conceived primarily as malodors and almost universally attributed to the PFI Kraft paper mill. As with any problem situation, actions with reference to it may be classified broadly into three groups: withdrawal, situation-redefining, and situation-altering.

Withdrawal may be cognitive, emotional, or physical in nature; i.e., may take the form of denial that the situation exists, denial or repression of emotions or feelings it arouses, or physical removal from the total problem-bearing environmental complex.

Efforts at situation-redefining may be distinguished from those of withdrawal in that they implicitly recognize or refer to the existence of the problem-bearing situation, but have as their aim some alteration of the meaning of the situation to the actor; e.g., a re-scaling of its salience relative to other problems, a reassignment of responsibility for it or assimilation of the situation to a different action-context, such as in the case of industrial pollution, that of the profit-production complex, rather than enjoyment-consumption.

Situation-altering, the third action possibility may also be considered in a variety of conceptual dimensions; e.g., individualistic - collectivistic, public - private, problem-source oriented - problem-effect oriented, etc.

Unfortunately, this analysis was written subsequent to completion of the data-gathering phase of the Clarkston survey so that many action possibilities with reference to air pollution in that community were left unexplored. Concerning withdrawal, only physical moves contemplated or actually made in response to air pollution were considered; and concerning situation-altering, only citizen complaint behavior, some alternate recommended courses of source-oriented behavior, and respondents' opinions of source-oriented actions taken by other actors.

Residential Moves: The state-wide California Health Survey of 1956[1] disclosed that 17 percent of Los Angeles County residents had seriously considered moving away (to destinations unspecified) because of air pollution, and 4 percent of the sample said they had actually moved in the past because of air pollution (p. 29).

In the Clarkston survey, questions concerning residential mobility were asked on an open-end basis and in the initial stages of the interview prior to explicit queries about air pollution. Responding to Item 5c, "Have you ever thought of moving to some city or town outside this area?" approximately a third said "yes." When asked, "For what reason?" four, or 11 percent gave of their own accord reasons related to air pollution. Whether the distribution of responses would have been different had respondents been asked, "Have you ever thought of moving to some city or town within this area?" (e.g., to Lewiston Orchards), and if so why, can only be a matter for conjecture. Similarly, one can only speculate as to the response of Clarkston residents to a direct question about air pollution as a factor in residential mobility, such as the question in the California Survey: "Have you ever considered seriously moving away from here because of air pollution?"

Complaints: In the 1958 study of public awareness of air pollution in Buffalo[3] approximately a fourth (24.6%) of the total sample (943) said yes to the question, "Have you ever wanted to complain to some authority or agency about offensive odors, dust, smoke, soot and the like in the air?" while 7 percent had actually made such a complaint. This ratio of complaint potential to complaint performance is very similar to that found in the NORC Study of community reactions to aircraft noise, for neighborhoods surrounding East Coast Air Defense Command Bases[7] (27 percent felt like complaining; 6 percent actually complained).

In the Clarkston survey, 10 percent of respondents said they had thought of requesting some authority or agency to take action concerning air pollution, while only 2 percent said they had actually made such a request. This is very close to the complaint potential - performance ratio found by the NORC Study among SAC neighborhoods of 11 percent to 2 percent.

These findings raise a number of questions for further inquiry. Most pertinent to the present study is the question of why both complaint potential and performance respecting air pollution were respectively two and three times higher in Buffalo than in Clarkston, given the facts previously documented that three-fourths of the Clarkston respondents considered air pollution serious in some degree, compared to only about a third of the Buffalo sample. Equally intriguing is the question of the extent to which these figures may be misleading as to actual complaint potential. For example, in their comments on the questionnaire, the Clarkston interviewers stated with reference to Item No. 10 ("Have you ever thought of requesting some authority to take action with reference to air pollution?"): "Many respondents said 'No, because it wouldn't do any good.' This was coded - No." (See Appendix D.)

Situation-Altering Action Potential: In an attempt to explore the potential for situation-altering actions other than complaints with reference to air pollution in Clarkston, the first step was to discover to what extent respondents felt the situation could be altered from a technical point of view. For this reason they were asked: (Item 14) "Do you believe that air pollution in Clarkston (a) Cannot be reduced below its present level? (b) Can be reduced below its present level? (c) Can be almost completely eliminated?"

Replies to this item show that only 4 percent of the subjects who believed air pollution existed in Clarkston (81) took the position that it could not be further reduced, while 14 percent said they didn't know. By contrast, 58 percent felt air pollution could be reduced, and 21 percent felt it could be almost completely eliminated in Clarkston.

In Item 16, interviewers asked respondents, "Which one of these statements do you think best describes the effort (each of the pollution sources respondent mentioned) is making to control air pollution in this area?" Table 24 presents the distribution of the respondents by the fixed responses provided for this item. Considering only figures for the PFI mill, nearly three-fourths of those who listed it as a pollution source said to varying degrees that it was not doing as much as it should to control air pollution in Clarkston.

Table 24. **RESPONSES TO ITEM 16: "WHICH ONE OF THESE STATEMENTS DO YOU THINK BEST DESCRIBES THE EFFORT (SOURCE(S) MENTIONED BY RESPONDENT) IS MAKING TO CONTROL AIR POLLUTION IN THIS AREA?"**

	Sources (1st, 2d, and 3d mentions)						
Effort	Autos	Mill	Houses	Dump	Stockyard	Packing Plant	Other
No effort to control air pollution	6	4	1	0	1	3	1
Very little effort	3	13	1	2	1	0	1
Some effort, but not as much as it should	1	41	2	2	0	0	1
A great deal of effort	0	15	0	1	0	0	0
Don't know	0	5	2	1	0	1	0
Total mentions	10	78	6	6	2	4	3

These two sets of data lead to the inference that a relatively high potential for situation-altering actions exists in Clarkston with reference to the air pollution problem. Eighty percent of respondents who recognized the existence of such a problem said it can be ameliorated; 75 percent of those who considered the PFI mill as the principal source of the problem said it was not doing as much as it should towards such amelioration.

To explore the ways in which this action-potential might take expression respondents were asked: "What do you think is the most important thing people should do about air pollution where it exists?" (Item 22). One emotional-withdrawal possibility was offered: "Put their minds on their work instead of on imagined or minor annoyances"; and one situation-defining or redefining alternative: "Try to get more information on the subject." The other two alternatives were more situation-altering in nature although differing on the dimension of activity-passivity; i.e., "Support the efforts which industry is making to eliminate air pollution" (passive); "Ask their elected officials for effective controls on air pollution" (active).

The distribution of responses among these possibilities (Table 25) shows that while respondents favor situation-altering actions over the other types by a ratio of 3 to 1, they are fairly evenly divided as between the active and passive choices for situation-altering. This equivalence disappears, however, when the various types of actions recommended are analyzed by Scale Type (a) according to serious-

Table 25. **RESPONSE TO ITEM 22: "WHAT DO YOU THINK IS THE MOST IMPORTANT THING PEOPLE SHOULD DO ABOUT AIR POLLUTION WHERE IT EXISTS?"**

Response	Percent sample	95% confidence level
Put their minds on their work instead of on imagined or minor annoyances	6	0-12
Support the efforts which industry is making to eliminate air pollution	38	31-44
Ask their elected officials for effective controls on air pollution	34	22-45
Try to get more information on the subject	20	14-26
Don't know	2	–
Totals	100	–

ness of air pollution as a personal and community problem (Table 26). This analysis indicates that persons who show high concern over air pollution in Clarkston are three times as likely to recommend the alternative of asking for effective controls as are respondents in the low concern category, while the latter are five times as likely to favor situation-defining or withdrawal actions.

Table 26. RECOMMENDED ACTION RE AIR POLLUTION, BY CONCERN WITH AIR POLLUTION (SCALE TYPE (a))[a]

	Scale type (a): Concern with air pollution		
Action recommended	Low (Types 0-2)	High (Types 3-4)	Totals
Put mind on work	6	0	6
Support industry efforts	19	16	35
Ask for effective controls	9	25	34
Get more information	14	4	18
Totals	48	45	93

[a] Statistical analysis – chi square significant at 0.05 level.

Response Characteristics of Persons in "High" or "Low" "Concern With Air Pollution" Scale-Types (Guttman Scale (a))

Guttman Scale analysis provided a means of dividing respondents into five levels of concern with air pollution as a personal and community problem. We examined the relationship of that concern to other attitudes within the scope of the survey to gain as complete an understanding as possible of the implications and ramifications of concern with air pollution for situation-defining more generally.

PHENOMENAL AWARENESS OF AIR POLLUTION

To what extent does concern with air pollution relate to the tendency to impute to others in the community an extensive awareness of such pollution? Tabulating the distribution of respondents on Scale Type (a) (Concern with Air Pollution) against that on Scale Type (b) (Dimension of Awareness of Air Pollution) provides an answer to this question. Table 27 shows persons in the extreme categories of concern, Types 0 and 3-4, Scale (a), tend markedly to project their degree of concern to others in the form of a high or low phenomenal awareness of air pollution.

Table 27. SCALE TYPE (a) COMPARED WITH SCALE TYPE (b): CONCERN WITH AIR POLLUTION BY AWARENESS OF IT IMPUTED TO OTHERS IN THE COMMUNITY[a]

Scale type (b): Awareness of air pollution by "others"	Scale type (a): Concern with air pollution			
	Type 0 None	Types 1-2 Low-Moderate	Types 3-4 High	Total
Types 0-2: Low	15	14	9	38
Types 3-5: High	5	16	37	58
Totals	20	30	46	96

[a] Statistical analysis – chi square significant at 0.01 level.

This tendency to projectivity may also be observed in respondents' answers to item 19: "How do you think local doctors and local papers feel about air pollution in this area?" Table 28 shows that persons with high concern are about three times as likely to impute such concern to doctors and newspapers, as are persons with low concern. On the other hand, the difference in response between persons of high and low concern to the question, "How do you think major local industries feel about air pollution in this area?" (also item 19) cannot be attributed to the operation of projectivity, since it appears principally in the "don't know" (DK) category (see Table 28). Persons of high concern tend to focus much more sharply on what they define as the source of their disturbance than do persons of low concern. Persons of high concern also tend to know, or to say they know, what the newspaper's position on air pollution is to a much greater extent than do persons of low concern (low concern - 55 percent DK re newspaper; high concern - 28 percent DK re newspaper). This finding is confirmed by responses to item 23, "Have you read or seen anything in the newspapers recently about air pollution?" The ratio of "yes" to "no" response among persons of high concern was 50-50, compared to a ratio of 1 "yes" to 4 "no" among those of low concern with air pollution (chi square significant at 0.05). These findings are completely consistent with results established from research on the selective impact of mass media communication; namely, that the amount of impact varies directly with subjects' pre-existing interest in the communication content.[10, 11]

Table 28. CONCERN WITH AIR POLLUTION IMPUTED TO DOCTORS, NEWSPAPER, AND MAJOR INDUSTRIES, BY RESPONDENTS' OWN CONCERN WITH AIR POLLUTION (ITEM 19) (GUTTMAN SCALE (a))

	Respondent's concern with air pollution	
Concern imputed to local doctors[a]	Low (Types 0-2)	High (Types 3-4)
No air pollution; air pollution not serious	19	14
Air pollution serious	5	14
Don't know	26	18
Concern imputed to local newspaper[a]		
No air pollution; air pollution not serious	17	20
Air pollution serious	4	11
Don't know	26	12
Concern imputed to major local industries[a]		
No air pollution; air pollution not serious	27	38
Air pollution serious	2	3
Don't know	19	5

[a] Statistical analysis – chi square significant at 0.05 level.

CONCERN WITH AIR POLLUTION AND CONCERN WITH HEALTH

Concern with air pollution, as measured by Guttman Scale (a), bears as it should a close relation to expressions of concern over the effects of air pollution on health although, as Table 29 shows, this relationship is far from perfect. It appears to be possible, in other words, to feel a high degree of concern with air pollution as a problem, without at the same time worrying over its effects on health; and half the respondents in the high-concern category express this possibility. Persons highly concerned with air pollution as a problem also tend to feel a greater concern over water pollution as a problem, as Table 30 brings out.

Table 29. RESPONSE TO ITEM 17: "DO YOU WORRY ABOUT THE EFFECTS OF AIR POLLUTION ON YOUR HEALTH?" BY CONCERN WITH AIR POLLUTION (GUTTMAN SCALE (a))[a]

Worry about effects of air pollution on health	Concern with air pollution	
	Low (Types 0-2)	High (Types 3-4)
"Yes" and "other"	6	24
"No" and not applicable	44	22

[a]Statistical analysis – chi square significant at 0.05 level.

Table 30. RESPONDENT'S RATING OF SERIOUSNESS OF WATER POLLUTION AS A PROBLEM FOR CLARKSTON TODAY, BY HIS CONCERN WITH AIR POLLUTION (GUTTMAN SCALE (a))[a]

Seriousness of water pollution	Concern with air pollution	
	Low (Types 0-2)	High (Types 3-4)
Serious, somewhat serious	7	16
Not serious and don't know	43	30

[a]Statistical analysis – chi square significant at 0.05 level

That these concerns with air pollution, water pollution, and health as affected by air pollution are not simply hypochondriacal in origin may be seen from the cross-tabulations of Scale Type (a) with respondents' own health rating (Table 31) and with their concern over contagious diseases (Table 32). Persons high and low in concern for air pollution distribute themselves in nearly identical fashion in their self-ratings of health-status, and their opinion of the seriousness of contagious diseases as a Clarkston problem.

COMMUNITY SATISFACTIONS AND CONCERN WITH AIR POLLUTION

The report, "Air Pollution Effects Reported by California Residents,"[1] states that those affected by air pollution were more prone to report dissatisfaction with their community. In Los Angeles County, 21 percent said they were not satisfied with the local area in which they lived; the proportion was 25 percent among those bothered by air pollution, but only 13 percent among those not bothered by air pollution. The difference was even greater in the San Francisco Bay Area: 37 and 14 percent; and in the rest of the State: 30 and 16 percent.

There is no conclusive evidence for the Clarkston population that this difference in community satisfaction exists as between those

Table 31. CONCERN WITH AIR POLLUTION BY RESPONDENT'S HEALTH STATUS (SELF-RATED)[a]

Self-rating of health	Concern with Air Pollution		Total
	Low	High	
Fair, poor, very poor	11	9	20
Good, excellent	39	37	76
Total	50	46	96

[a] Statistical analysis – chi square not significant.

Table 32. CONCERN WITH AIR POLLUTION BY SERIOUSNESS OF CONTAGIOUS DISEASES AS CLARKSTON PROBLEM[a]

Concern with air pollution	Seriousness of Contagious Diseases			Total
	Serious - Somewhat serious	Not serious	Don't know	
Low	2	43	5	50
High	3	40	3	46

[a] Statistical analysis – chi square not significant.

bothered and not bothered by air pollution; or if it does, the sample was too small or the questionnaire unsuited to discover it. Table 33 shows that a third of respondents who are not bothered or are bothered only moderately by air pollution rate Clarkston an excellent place to live, compared to only a fifth of the respondents who are highly concerned with air pollution. Furthermore, nearly a fifth of the high-concern group rate Clarkston fair to poor, compared to only a tenth of the low-concern group. Chi square analysis demonstrates, however, that this result has about a 20 percent chance of occurring through sampling variation alone, which is too great a possibility to support the inference of a difference in community satisfaction in the Clarkston population of those concerned versus those not concerned with air pollution.

If, however, the data from Table 33 are restricted in their applicability to members of the Clarkston sample only, the fact remains that although the proportion dissatisfied with their community is only two-thirds in Clarkston what it is in Los Angeles (14 percent versus 21 percent), the ratio (community dissatisfaction among those concerned to community dissatisfaction among those not concerned with air pollution) is approximately the same for Clarkston as it is for Los Angeles -- i.e., two to one.

Table 33. RATING OF CLARKSTON AS PLACE TO LIVE, BY CONCERN WITH AIR POLLUTION (SCALE (e))[a]

Rating of Clarkston	Concern with air pollution	
	Low (types 0-2)	High (types 3-4)
Excellent	17	9
Good	28	28
Fair-Poor) Very Poor)	5	9
Totals	50	46

[a] Statistical analysis – chi square not significant.

A final attempt to relate community satisfaction with disturbances attributed to air pollution may be of interest because of its negative results: the analysis of seriousness of concern with air pollution among those who spontaneously mentioned the Clarkston climate as an advantage to living there, compared to those who did not mention it. To account for this relationship, two alternate hypotheses are equally plausible: (1) Persons who like Clarkston because of its climate are insensitive to or are not bothered by the air pollution that may exist in the area; or (2) persons who like the Clarkston climate are more concerned with air pollution than those who are indifferent or negative to it because such pollution may detract from the climatic advantages they prize.

Unfortunately, the data show that neither hypothesis is tenable at the conventional 0.05 level of statistical significance. (See Table 34.) At most, we can say that the distribution by spontaneous mention of climate as an advantage by persons at the extremes of air pollution concern (Guttman Scale (a) Types 0 and 4) is suggestive of the second hypothesis.

Attitudes Toward Air Pollution Related to Respondents' Ecological, Socio-Economic, and Demographic Characteristics

To this point, this report has been primarily clinical or descriptive of the extensity of the air pollution phenomenon as defined by Clarkston residents; of the intensity of their concern with it as a source of disturbance, personal and communal; of actions residents have taken or propose to take with respect to air pollution; and of their attributions of its source.

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Table 34. CONCERN WITH AIR POLLUTION, BY SPONTANEOUS MENTION OF CLIMATE AS CLARKSTON ADVANTAGE[a]

	Guttman scale (a): Concern with air pollution		
Spontaneous mention, climate as advantage	None Type 0	Low to High Types 1-3	Very High Type 4
Yes	7	25	13
No	13	29	9

[a] Statistical analysis – chi square not significant.

The present and succeeding sections attempt to relate these attitudinal variables to various characteristics of the respondents who express them, so as to obtain an etiological as well as a clinical understanding of the phenomenon, "concern" or "disturbance" with respect to air pollution. This attempt is not presented in any sense as an explanation of variations in the attitudes under scrutiny, but only as a necessary first step in arriving at such explanations.

We will first examine respondents' ecological characteristics; i.e., respondents' geographic location with reference to presumed sources of pollution in Clarkston and to topographic features of significance in the meteorological diffusion of pollutants.

Previous studies have documented an ecological component in levels of exposure, by residence, to different types of ambient air pollution.[4, 12] That component follows roughly the pattern one would expect, reasoning from the concentric zone model of urban development advanced by E. W. Burgess,[13] i.e., of decreasing levels of exposure with increasing radial distances from the center of the city and the increasing socio-economic levels of its inhabitants. Differential exposure to particulates appears to follow this pattern more closely than does exposure to gaseous pollutants such as sulfur dioxide.[11]

In view of these findings, it seemed reasonable to attempt to relate awareness and concern with air pollution on the part of Clarkston residents with their differential residential location. The contour map of the Lewiston-Clarkston area (Figure 1) shows that with three minor exceptions, (A, H, and G), all of the 20 potential air pollution sources of an industrial nature in the area are located north of a line bisecting Clarkston from east to west at the approximate location of Sycamore Street (Figure 2). In addition, a rise in altitude of approximately 150 feet occurs from the northern to the southern boundaries of the city although this is of a very gradual nature.

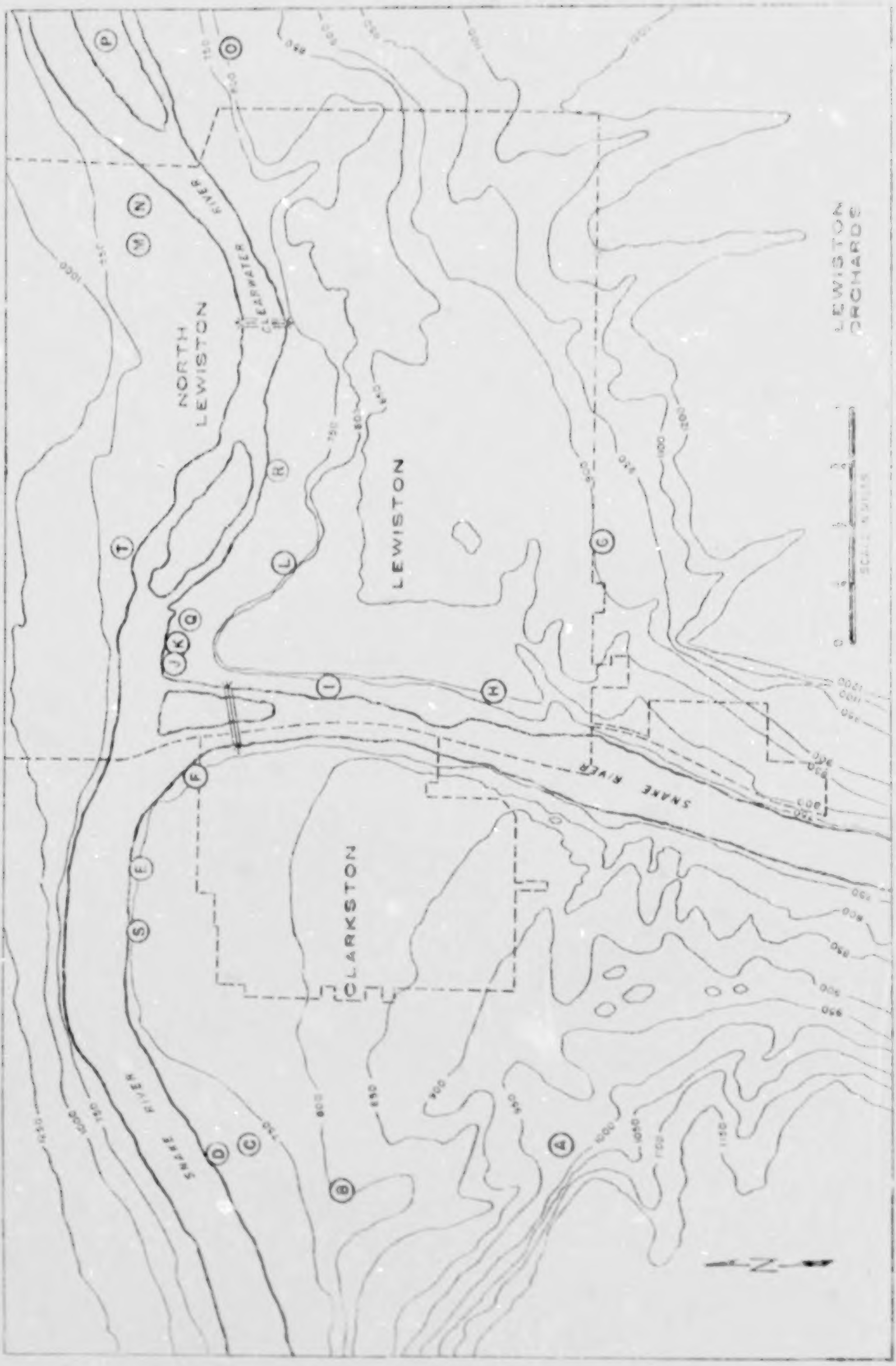
NORTH LEWISTON
LEWISTON
CLARKSTON
LEWISTON ORCHARDS
SNAKE RIVER
CLEARWATER RIVER
SCALE IN MILES
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
750
800
850
900
950
1000
1050
1100
1150
1200

Figure 1. CONTOUR MAP OF LEWISTON-CLARKSTON AREA SHOWING MAJOR POTENTIAL SOURCES OF AIR POLLUTION

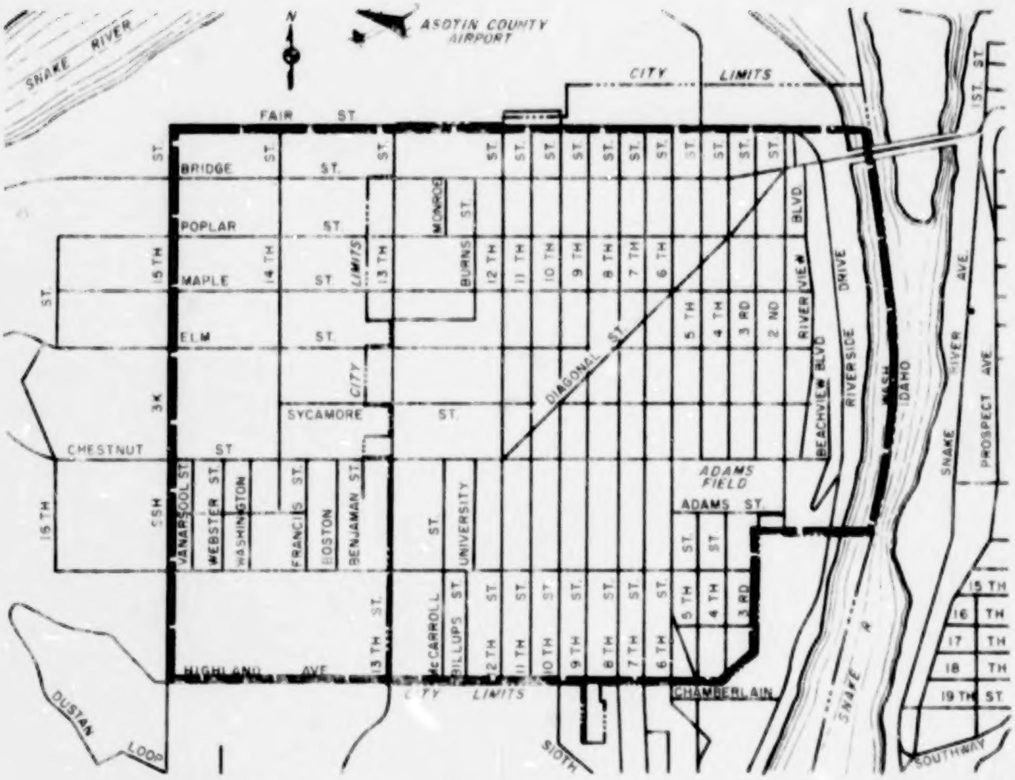
SNAKE RIVER
N
ASOTIN COUNTY AIRPORT
CITY LIMITS
FAIR ST.
BRIDGE ST.
POPLAR ST.
MAPLE ST.
ELM ST.
SYCAMORE ST.
CHESTNUT ST.
HIGHLAND AVE.
15TH ST.
14TH ST.
13TH ST.
12TH
11TH
10TH
9TH
8TH
7TH
6TH
5TH
4TH
3RD
2ND
MONROE ST.
BURNS ST.
LIMITS
CITY
DIAGONAL ST.
RIVERVIEW BLVD.
RIVERSIDE DRIVE
BEACHVIEW BLVD.
WASH.
IDAHO
SNAKE RIVER AVE.
PROSPECT AVE.
1ST ST.
ADAMS FIELD
ADAMS ST.
VANARSDOL ST.
WEBSTER ST.
WASHINGTON
FRANCIS ST.
BOSTON
BENJAMAN ST.
UNIVERSITY ST.
McCARROLL
BILLUPS ST.
CHAMBERLAIN
CITY LIMITS
DUSTAN LOOP
SIXTH
SNAKE R.
15TH
16TH
17TH
18TH
19TH ST.
SOUTHWAY

Figure 2. AREA OF OPINION SURVEY IN CLARKSTON, WASHINGTON.

Key to Figure 1.

A. Guy Bennett Box Factory & Lumber Company
B. J. B. Lumber Company
C. Meats Incorporated – Meat Packing Plant
D. Meats Incorporated – Stockyard
E. Clarkston City Dump
F. Bristol Packing Company – Meat Packing Plant
G. Asphalt & Paving Company
H. Bullet Factory
I. Nez Perce Roller Mills – Feed Mill
J. Seabrook Farms Company – Frozen Food Plant
K. Smith Frozen Foods of Idaho
L. Twin City Plating & Manufacturing Company
M. Feed Mill
N. Twin City Sales Yard – North Lewiston Stockyard
O. Twin City Sales Yard – East Lewiston Stockyard
P. Potlatch Forests Incorporated (PFI)
Q. Prairie Flour Mill Company
R. Lewiston Green Growers Inc. – Feed Mill
S. Clarkston Sewage Treatment Plant
T. Lewiston Sewage Treatment Plant

Based on these two facts, a north-south division seemed the most likely to provide differences in residential exposure to pollutants, on the one hand, and differences in awareness of and concern of respondents with such exposure on the other. To obtain such a division, Sycamore Street extended to 15th was used as a boundary between the northern and southern halves of the city. Between 14th and 15th Streets, household street numbers in the 800's were placed in the north area; and numbers in the 900's were placed in the south. So classified, 51 households of the sample fall in the northern half and 53 in the southern.

Turning now to responses of sample members in these two geographical areas, the first and major finding is that they show no significant differences in recognition of the existence of air pollution or in concern with it as a personal or community problem, using Guttman Scale (a) as indicator of such concern. Sample members in the northern sector are divided on a 50-50 basis as between scale types indicating high concern (3, 4) and low (0, 1, 2). In the southern sector there is a slight preponderance of low-concern respondents over the high-concern scale types, in the ratio of 13 to 11. So far as sheer awareness or recognition of air pollution is concerned, 10 respondents in the northern and 13 in the southern sections of Clarkston say air pollution does not exist in the Lewiston-Clarkston area.

A much greater difference appears, however, in the phenomenal awareness of air pollution between respondents in the northern and the southern halves of Clarkston. In the southern sector respondents fall almost equally in Scale Type (b) 0-2 (low phenomenal awareness) and types 3-5 (high phenomenal awareness) (24 versus 29), whereas in the northern sector only half as many respondents are in the low as in the high awareness classification (17 versus 34).

Since this difference is below the 0.05 level of significance, no claim will be made that it exists in the Clarkston population of household heads; however, this finding indicates that persons in the northern sector may be more likely than those in the southern to think of air pollution in terms of dustfall and nose and eye irritation, as well as malodor.

As to attributed sources of air pollution, the data again show no significant difference between respondents in the northern and southern parts of Clarkston. Thirty-six in the northern and 39 in the southern, give the mill as their first response to the question, "What do you think are the major sources of pollution in this area?" (item 15). Five persons, however, in the northern sector referred to some source other than the mill in their first response compared to only one in the southern sector. Table 35, which combines first and second mentions of source by residential location of respondents, shows a more diverse attribution of pollution sources among respondents in the northern than in the southern section of Clarkston.

Finally, a difference appears in the number of respondents in the

Table 35. ATTRIBUTED MAJOR SOURCES OF AIR POLLUTION IN THE LEWISTON-CLARKSTON AREA, BY GEOGRAPHIC LOCATION OF RESPONDENT (ITEM 15) (FIRST AND SECOND MENTIONS OF SOURCE COMBINED)

	Geographic area of Clarkston	
Attributed source of pollution	North (Number mentions)	South (Number mentions)
Automotive vehicles	3	7
Pulp mill	38	40
Home trash burners	3	2
City dump	6	0
Stockyard	2	0
Packing plant	2	1
Other	2	1
Don't know	1	0

two areas who say that Clarkston has health problems that need correction: 43 percent (22) in the northern, compared to 26 percent (14) in the southern section. Again, however, this difference is below the 0.05 level of significance.

Table 36 shows that water not air pollution accounts for the difference in concern in the two areas over the sources of Clarkston health problems mentioned sponaneously by respondents.

To summarize, recognition of and concern with air pollution, as expressed by the respondents and, by inference, the Clarkston population, are not related to the residential location of respondents. Such location does, however, appear to affect the nature of the air pollution phenomenon as experienced by respondents; their attribution of secondary sources of pollution; and their concern with Clarkston health problems other than air pollution.

This finding throws into relief the significance of factors other than exposure to pollutants "objectively" present in ambient air that may underlie variations in expressed concern with air pollution as a personal and community problem. These are the factors of personality, social status, and culture, approached through behavioral rather than physical science. The relatively small size of the sample precluded detailed examination of these factors in the present case; an attempt was made, however, to analyze variations in concern or disturbance connected with air pollution, in relation to three social status variables: occupation of household head; sex of respondent; and length of residence in Clarkston.

SOCIAL STATUS VARIABLES IN RELATION TO CONCERN WITH AIR POLLUTION

Before proceeding to the findings on the relationship of these social status variables to concern with air pollution, some explanation

Table 36. **RESPONSES TO ITEM 6: "DO YOU BELIEVE CLARKSTON HAS ANY HEALTH PROBLEMS THAT NEED CORRECTION?"**

Sources of health problems, first mentioned	Geographic location North Number respondents	 South Number respondents
Restaurants	1	2
Garbage dump, city dump	1	1
Animals, stockyard	2	0
Packing plant	0	0
Pulp mill	7	6
Water	8	0
Alleys, old housing slums, abandoned buildings, vacant lots	1	1
Air (general reference to air pollution)	1	2
Other	1	2
No mention	29	39
Totals	51	53

may be in order of the selection of the variables themselves.

Occupation of household head, rather than occupation of respondent, was selected because of its strategic position as indicator and determinant of the general cultural outlook of a household or family commonly associated with its social class position. Length of residence is regarded here primarily as a social status variable, in the sense that it differentiates old-timers or old-settlers from the relative newcomers to an area. To an undetermined extent, however, it is possible that length of residence may also be an indicator of different types or degrees of physiological adaptation to environmental conditions such as air pollution. Sex also is regarded here primarily as a social status rather than as a physiological variable, although here again it is possible that physiological differences associated with sex may enter into differential sensitivity to environmental conditions such as air pollution independently of the behavior and culture patterns associated with sex as a status.

The general findings on the relation of these three variables to concern with air pollution may be stated very simply in four propositions: (1) The higher the occupational level of the household head, the greater is the concern with air pollution that is expressed by the head or his spouse; (2) the longer the respondent's period of residence in Clarkston, the greater is his concern with air pollution in that city; (3) the differentiation in concern with air pollution by occupational group becomes more pronounced with length of residence in Clarkston -- i.e., occupational status and length of residence status interact positively in relation to concern with air pollution; and (4) there is no difference in the degree of concern with air pollution expressed by men and by women in the sample. This equivalence, however, tends to disappear when response by sex is controlled by length of residence and by occupation of household head.

Occupation of household head as factor in concern with air pollution. Three categories graded by social status or prestige constitute the occupational variable:

1. Managers, proprietors, professionals
2. Clerical and skilled labor
3. Semi-skilled and unskilled workers

Twenty-four respondents were classified in the first category, 37 in the second, and 26 in the third. Seventeen respondents fall outside the range of the occupational variable since they were not in the labor market; household heads so classified were for the most part retired.

Very little difference appears between respondents in the three occupational categories so far as sheer awareness or recognition of air pollution in Clarkston is concerned. Among professionals and managers, 22 say air pollution exists in Clarkston, 2 say it does not. Corresponding figures for the clerical and labor categories are 29 to 8, and 21 to 4, respectively. Only among those not in the labor market does the ratio, recognition - non-recognition, approach equality at 9 to 8.

Similar distributions in the three occupational categories are also observed in response to item 13 as to how much respondent is bothered by air pollution. As between the responses, "not bothered," "somewhat bothered," "bothered quite a lot," professionals, etc., are distributed 2-16-4; clerical workers, etc., 7-16-6; semi-skilled and unskilled, 5-14-2.

With respect to all other indices of concern with air pollution, however, respondents in the professional-managerial categories distribute themselves in a markedly different way from those in the other two occupational classes. Professionals, managers, and proprietors are found nearly four times as frequently in the high phenomenal awareness types of Guttman Scale (b) as in the low (19 to 5). Among clerical workers and laborers, this ratio is approximately equal (20-17, 13-13).

Twice as many professionals, managers, and proprietors are in the high-concern types of Guttman Scale (a) as in the low -- 15 to 7. Among clerical and skilled labor respondents, this ratio is 17 to 19; for laborers it is 9 to 13. Respondents in the professional-managerial group are much more apt to say they worry about the effects of air pollution on health and property than are respondents in the clerical, etc., and labor categories (Tables 37 and 38); they are much more likely to have remembered reading news about air pollution in the local paper (see Table 39). Finally, professional and managerial respondents are much more likely to rate air pollution as a serious problem for Clarkston today, than are respondents in the other two categories (see Table 40). While none of these differences in concern with air pollution by occupation of household head is significant at the 0.05 level, taken together they add up to a picture that is important in the writer's opinion; namely, that respondents in the professional and managerial category regard air pollution as a serious problem facing the Clarkston community to a much greater extent than do respondents in the other occupational classes. That professional-managerial persons do not at the same time express themselves as being bothered to a greater extent by air pollution simply supports the findings of other studies that such persons are better able to distinguish between personal and community problems than are members of other occupational classes.[14]

Length of residence in Clarkston and concern with air pollution. Theories of adjustment to noxious environmental conditions may be divided roughly into one of two types according to whether they posit habituation or exacerbation as the primary adjustive mechanisms. According to theories of the first type, as length of exposure to the noxious condition increases, the condition itself tends to recede into the background of conscious awareness until the individual takes no more notice of the condition than a fish may of water. By contrast, theories of the second type hold that exacerbation with the condition increases with length of exposure to it to the point that the individual requires change of the environment or withdrawal from it.

To test these hypotheses, we divided respondents into two categories by length of residence in Clarkston: Those who had lived in Clarkston in 1950 or before (40); and those who had moved to Clarkston in 1951 or after (64). The second category included 13 respondents who had moved from Lewiston to Clarkston in 1951 or later.

On one dimension of the attitudes under consideration, i.e., salience of air pollution as a source of disturbance, very little difference appears between the old-time residents and the newcomers; 35 percent of the former (14) compared to 31 percent of the latter (20) mentioned air pollution spontaneously as a disadvantage to living in Clarkston. On all other dimensions of awareness and concern, however, the old-time residents distribute themselves very differently from the newcomers. On the dimension, concern with Clarkston health problems, the two distributions are significantly different at the 0.05 level: 55 percent of the old-timers compared to 22 percent of the newcomers

Table 37. RESPONSE TO ITEM 17: "DO YOU WORRY ABOUT THE EFFECTS OF AIR POLLUTION ON YOUR HEALTH?" BY OCCUPATION OF HOUSEHOLD HEAD [a]

	Worry about air pollution re health		
Occupation of household head	Yes	No	Not applicable,[b] other
Professional, etc.	9	11	4
Clerical, etc.	10	17	10
Labor	3	18	5

[a] Statistical analysis – chi square not significant.

[b] Answered "No" to item, "Does air pollution exist in Clarkston?"

Table 38. RESPONSE TO ITEM 18: "DO YOU WORRY ABOUT THE EFFECTS OF AIR POLLUTION ON YOUR PROPERTY?" BY OCCUPATION OF HOUSEHOLD HEAD [a]

	Worry about air pollution re property		
Occupation of household head	Yes	No	Not applicable,[b] other
Professional, etc.	12	9	3
Clerical, etc.	12	15	10
Labor	7	11	8

[a] Statistical analysis – chi square not significant.

[b] Answer "No" to item, "Does air pollution exist in Clarkston?"

Table 39. RECENT EXPOSURE TO NEWS ABOUT AIR POLLUTION (ITEM 23), BY OCCUPATION OF HOUSEHOLD HEAD [c]

Occupation of household head	Recent exposure to air pollution news	
	Yes	No
Professional, etc.	11	13
Clerical, etc.	7	30
Labor	9	17

[a] Statistical analysis – chi square not significant.

Table 40. CONCERN WITH AIR POLLUTION (GUTTMAN SCALE (a)) BY OCCUPATION OF HOUSEHOLD HEAD[a]

Occupation of household head	Scale (a) type: Concern with air pollution	
	Low (types 0-2)	High (types 3-4)
Professionals, etc.	7	15
Clerical, etc.	19	17
Labor	13	9

[a] Statistical analysis – chi square not significant.

say Clarkston has health problems that need correction; nearly two-thirds of the old-time residents who said Clarkston has such problems mentioned either the mill or bad air spontaneously as a health problem, compared to only 14 percent (2) of the newcomers who said Clarkston had health problems (see Table 41). Twenty-five percent (16) of the newcomers compared to 15 percent (6) of the old-time residents say air pollution does not exist at any time in Clarkston.* Thirty-five percent of the old compared to 17 percent of the new residents say air pollution is a serious problem for Clarkston today, although nearly identical proportions of the old and new residents say it is either a serious or a somewhat serious problem - 72 versus 70 percent. Fewer old than new residents think that air pollution is becoming a less serious problem -- 33 percent (13) compared to 54 percent (32).* A significantly larger number of the old-time residents say they are somewhat bothered or bothered quite a lot by air pollution in Clarkston than do the new: 74 versus 57 percent. Significantly more of the old-time residents fall in the high concern types of Guttman Scale (a) than do the newcomers: 63 percent (24) vs. 38 percent (22). Finally, when asked what they thought is the most important thing people should do about air pollution where it exists, 45 percent (17) of the old-time residents said "ask their elected officials for more effective controls" compared to only 28 percent (18) of the newcomers (see Table 42).

These facts seem to provide fairly solid support for the theory that increasing length of exposure to what is defined as a noxious environmental condition produces increasing exacerbation rather than habituation to it. The Swedish study of hygienic nuisances from a sulfate pulp mill[5] also provides support for this view. According to the report,

> "In answer to the question as to whether the annoyance had changed during the last three months, 5% of those

---

* Difference not significant at 0.05 level.

Table 41. CONCERN WITH CLARKSTON HEALTH PROBLEMS, BY LENGTH OF RESIDENCE, CLARKSTON[a]

Length of residence, Clarkston	Clarkston health problems			
	No health problem	The mill or bad air	All other health problems	Total
1950 or before	18	14	8	40
1951 or after	50	2	12	64
Totals	68	16	20	104

[a] Statistical analysis – chi square significant at 0.05 level.

Table 42. WHAT TO DO ABOUT AIR POLLUTION (ITEM 22) BY LENGTH OF RESIDENCE, CLARKSTON[a]

Length of residence, Clarkston	Recommended action			
	Put mind on work	Support industry	Ask for controls	Get more information
1950 or before	2	13	17	6
1951 or after	4	26	18	15

[a] Statistical analysis – chi square not significant.

> who were annoyed by the odor said that the annoyance had lessened and 22% that it had increased." (p. 7).

The facts of the Clarkston survey, however, cast some doubt on the validity if not the veracity of a further finding of the Swedish study that "among those annoyed, 57% said that they believed they would get used to the malodor" (p. 8).

The facts we reported in this survey have nothing to do with differences in residential location of the old-time residents versus the newcomers; actually, a somewhat larger proportion of the former than of the latter live in the southern half of Clarkston (old-time residents: 17 in north, 23 in south; new residents: 34 in north, 30 in south). The differences in concern with air pollution reported between old and new residents, however, may derive to some extent from differences in their occupational distribution; Table 43 shows that disproportionately more new than old residents are classified in the clerical-skilled worker and labor categories, although this difference is not significant at the 0.05 level.

Table 43. LENGTH OF RESIDENCE IN CLARKSTON, BY OCCUPATION OF HOUSEHOLD HEAD[a]

Length of residence in Clarkston	Occupation of household head			
	Not in labor market (retired, etc.)	Professional, etc.	Clerical, etc.	Labor, etc.
1950 or before	8	11	12	9
1951 or after	9	13	25	17

[a] Statistical analysis – chi square not significant.

To gain some idea of the nature of the interaction between the two variables, length of residence and occupation of household head, so far as this expresses itself in concern with air pollution, Table 44 shows the distribution of respondents by occupational categories on Guttman Scale (a) controlled by length of residence. From this distribution it appears that length of residence operates in the same way on all occupational categories, i.e., in the direction of greater concern with air pollution, although the operation of this factor appears most pronounced in the case of professionals, properietors, and managers. This observation, however, also leads to the conclusion that the difference in concern with air pollution between old and new residents of Clarkston is not simply an artifact of their differential occupational distribution.

Table 44. OCCUPATION, HOUSEHOLD HEAD, BY CONCERN WITH AIR POLLUTION (SCALE (a)), CONTROLLED BY LENGTH OF RESIDENCE, CLARKSTON

Residence, Clarkston							
1950 or before				1951 or after			
Occupation of household head				Occupation of household head			
Concern with air pollution	Professional, etc.	Clerical, etc.	Labor	Concern with air pollution	Professional, etc.	Clerical, etc.	Labor
Low (Types 0-2)	1	5	4	Low	6	14	9
High (Types 3-4)	9	7	5	High	6	10	4

Sex of respondent is the final social status variable considered in relation to concern with air pollution. The Swedish study[5] showed that more women than men reported annoyance with sulfate odors and that this difference appeared in both younger and older age groups (see Table 45).

Table 45. ODOR ANNOYANCE FOR WOMEN AND MEN IN TWO AGE GROUPS FROM "STUDIES OF HYGIENIC NUISANCES OF WASTE GASES FROM A SULFATE PULP MILL" (IN SWEDEN)[a]

	Percent annoyed by "sulfate odor"	Percent not annoyed by "sulfate odor"
Older men (born 1909 or earlier)	26	74
Younger men (born after 1909)	35	65
Older women (born 1910 or earlier)	30	70
Younger women (born after 1910)	53	47

[a] Reference 5, page 8.

Although we did not analyze response by age, our finding with respect to sex is markedly different from the Swedish results. Briefly, sex of respondent alone does not bear any relationship to differences in concern with air pollution. Among men, 22 fall in the low-concern types of Guttman Scale (a) (Types 0-2); 21 in the high-concern types (3-4). Among women, the corresponding figures are 28 and 25. If anything, men appear to have a greater degree of phenomenal awareness of air pollution in Clarkston than do women; 64 percent of the men are in the high phenomenal awareness types of Scale (b) (3-5), compared to 58 percent of the women (not significant).

When response according to sex is controlled by other social status variables, however, differences do show up in concern with air pollution on the part of men compared to women. Table 46 introduces as control, length of residence in Clarkston. These data show that while the length of residence factor operates in the same direction for both men and women, i.e., to produce more concern with air pollution, this effect is much greater for men than for women.

Table 46. **RESPONDENT'S SEX BY CONCERN WITH AIR POLLUTION, CONTROLLED BY LENGTH OF RESIDENCE, CLARKSTON**

Residence, Clarkston					
1950 or before			1951 or after		
Concern with air pollution	Respondent's sex		Concern with air pollution	Respondent's sex	
	male	female		male	female
Low (0-2)	4 (27%)	10 (44%)	Low	18 (64%)	18 (60%)
High (3-4)	11 (73%)	13 (56%)	High	10 (36%)	12 (40%)
Total	15 (100%)	23 (100%)	Total	28 (100%)	30 (100%)

Table 47. **RESPONDENT'S SEX BY CONCERN WITH AIR POLLUTION, CONTROLLED BY OCCUPATION OF HOUSEHOLD HEAD**

Concern with air pollution (Scale (a))	Occupation of household head					
	Professional, etc.		Clerical, etc.		Labor	
	men	women	men	women	men	women
Low (0-2)	2	5	10	9	4	9
High (3-4)	8	7	5	12	6	3

Table 47 introduces as control, occupation of household head. Here the data are simply inconclusive; if they show anything, it is that far more study may be required to understand the differential response, if any, of men and women to environmental conditions such as air pollution.

PRINCIPAL FINDINGS AND DISCUSSION

In a recent article, G. A. Hansen, Technical Director, Weyerhauser Company Pulp and Paperboard Division, states: "Since the time the first kraft mill was built back in 1891, the men who operated these mills were well aware of the fact that they had an air pollution problem .... Today, even with all of the progress in recent years, most kraft pulp mills are still living with this problem."[15]

Results of our survey of public opinion concerning air quality in Clarkston in May 1962 demonstrate fairly conclusively (i.e., at the 95%

level of confidence) that between 70 and 86 percent of household heads and spouses in that city are also still living with this problem; that of these, between 53 and 75 percent are "somewhat bothered," and between 9 and 25 percent are bothered "quite a lot" by the problem; and that only 17 to 32 percent of household heads and spouses would rate air pollution "not serious" as a problem for Clarkston today. Trendwise, the survey shows that between 9 and 30 percent of household heads and spouses in Clarkston think the air pollution problem has grown "less serious" each year; between 14 and 36 percent think it has become "more serious" each year; while from 16 to 38 percent say it has "continuously been a serious problem" for Clarkston in recent years.

When we measured degree of disturbance with respect to air pollution, combining the elements of personal annoyance and community concern with the problem, 21 percent of respondents scored in the "not disturbed" range; 31 percent showed a degree of disturbance that ranged from "low" to "moderate"; while 48 percent scored in the range of the scale that indicated a "high" degree of disturbance with respect to air pollution. Between 85 and 97 percent of the population surveyed would say that the words "air pollution" mean frequent bad smells in the air to most people in the Lewiston-Clarkston area; between 62 and 86 percent would say these words mean frequent haze or fog in the air; between 55 and 68 percent, that they mean frequent nose or throat irritation; between 31 and 50 percent, frequent irritation of the eyes; while 17 to 36 percent would say that air pollution means too much dust and dirt in the air to people in the Lewiston-Clarkston Valley. As to source, between 88 and 97 percent of those in the Clarkston population who believe air pollution exists in the area mention first "the mill" or the "pulp mill."

Concerning actions they would take with reference to air pollution, between less than 1 percent to 12 percent of the Clarkston population would ignore the problem; from 14 to 26 percent would try to get more information about it; between 31 and 44 percent are disposed to rely primarily on industry's efforts at control; and from 22 to 45 percent would ask their elected officials for enactment of controls on pollution of the air.

Respondents' concern with air pollution as a personal and as a community problem bears no relation to residential location in the northern or southern half of Clarkston, although such location does relate to differential awareness of dustfall as an aspect of air pollution; more respondents who live in the northern half of Clarkston show such awareness. This finding appears compatible with the widespread diffusion of odor-bearing substances from kraft pulp mills reported in other studies,[16] together with the geographic facts relating to location of other industries in Clarkston.

Degree of disturbance or concern with air pollution does bear a strong relationship, however, to length of residence in Clarkston and to occupation of the household head. Approximately two-thirds of persons interviewed who had lived in Clarkston in 1950 or before were highly disturbed by air pollution as a problem, compared to a little over a third of those who had moved to the city in 1951 or later. Independently of length of residence, respondents from households whose heads are professionals, proprietors, or managers express the most concern with air pollution; those from households whose heads are semi-skilled or unskilled express the least concern; those from clerical and skilled-craft backgrounds stand in between.

On the basis of these findings, air pollution in Clarkston appears to constitute a problem that is community-wide in scope, both geographically and socially. In addition, the more involved or identified persons are with Clarkston as a community, the more concern they tend to express with air pollution as a community problem. In other words, concern with air pollution in Clarkston does not apparently stem from, lead to, or express generalized negative feelings towards or rejection of the community as a place to live; on the contrary, such concern appears to grow out of widespread feelings of civic pride and community identification and to lead to attempts to ameliorate the situation. So far as the problem of air pollution in Clarkston is concerned, the typical Clarkston resident may be compared to a man whose wife has "B.O." Such a man may love his wife and think not at all of leaving her; yet he cannot help wishing at night or when company comes that she or her doctor could rid her of this condition.

From the methodological standpoint of research on environmental health problems, this study may be of interest in that it took place under circumstances that dramatize the independence of psycho-social variables (e.g., awareness of environmental pollution, and definition of such pollution as an individual or social problem) from physically defined levels of pollution. The physical level of air pollution in Clarkston appears to be roughly a constant for people who live in different areas of the city; yet phenomenal awareness and concern with it as a problem vary markedly between socially defined sub-groups of the Clarkston population. In turn, this independence of the psycho-social from the physical variables of the environmental health complex in Clarkston demonstrates the need to deal with each set of variables in terms that are conceptually appropriate or relevant, rather than to reduce the one set of variables to dependence on the other.

In a society, therefore, awareness or definition of pollution as a problem cannot be regarded as a simple direct function of the society's capacity to produce pollution. Instead, some of the same factors that lead to high capacity to pollute the air may lead to low awareness of air pollution as a social problem. In the Victorian society of Britain and America, the cultural factors of individualism and sensual repression may have contributed to a high capacity for material production, both of goods and of air pollution, and to a low awareness of air pollution as a social problem. Victorians adapted themselves to air pollution as did British moths, i.e., by melanism,[17] or they coped with it individualistically by moving to the country if they could.

Today broad changes in the social structure and ideology of American society have given rise to a generally increased awareness and a generally lowered tolerance of air pollution as an environmental condition. Among such changes may be cited:

1. The constantly declining proportion of blue collar as compared to white collar workers in the labor force, with a corresponding increase in middle-class white-collar dirt and odor phobia and emphasis on cleanliness as a status symbol.

2. The increasing ideological emphasis on values relating to consumption by comparison to those relating to production. Because of this change of emphasis, industrial pollution may no longer be regarded as positive evidence of success in production so much as evidence of lack of success in consumption or "good living."

Given these and other changes in the socio-cultural system, a situation is entirely conceivable in which an increasing concern with air pollution as a social problem may occur in the very same place and period when physical levels of pollution are decreasing. In fact this may well be the situation in Clarkston. The writer knows of no grounds for doubting the statements of PFI officials that they have substantially reduced the quantity of odor-bearing effluent from their mill in the period 1951 to May 1962; yet in May 1962, 52 percent of respondents in the present survey said air pollution as malodor had either remained unchanged over these years as a serious problem for Clarkston or had increased in gravity.

Examples of this kind make evident the need for a broad research attack on the relationship between the social system and physical system dynamics, which together constitute the eco-sphere of man. If men define situations as real they will be real in their consequences. The reality of the Clarkston residents' perception of their air environment is evidently no simple function of the reality of that environment as defined aerometrically. From increased understanding of the independence -- and interdependence -- of these two orders of reality may come progress in achieving the goals of environmental health.

REFERENCES

1. Air pollution effects reported by California residents. A special air pollution study carried out under the general direction of Lester Breslow, Chief, Bureau of Chronic Diseases. From The California Health Survey. State of California Dept. of Public Health. n.d. 56 pp.

2. Public awareness of air pollution as a community problem in Erie County, N.Y. Preliminary report. P. Valien. New York State Air Pollution Control Board. 1957. See also unpublished paper, same title, presented to Engineering and Sanitation Section, APHA, 1959, by P. Valien.

3. Telephone survey of Buffalo residence to replicate 1958 study. (See reference 2 above.) Sponsoring Agency: USPHS - DAP. Report forthcoming. (N. Medalia, DAP, Project Officer; I. deGroot, University of Buffalo, Field Supervisor.)

4. The public reaction to air pollution in Nashville, Tenn. W. S. Smith, D. Zeidberg, and J. J. Schueneman. JAPCA. 14:418-23. Oct. 1964.

5. Studies of hygienic nuisances of waste gases from a sulfate pulp mill (Part I): An interview investigation. L. Friberg, E. Jousson, and R. Cederlof. Norsk Hygienisk Tidskrift (Scandinavian Hygiene Magazine). 41(Nos. 3-4):41-62. 1960.

6. Report to the Senate of the 120th General Assembly, State of Delaware, by the Delaware Air Pollution Authority, March 14, 1960.

7. Community reactions to air force noise. Parts I and II. P. N. Borsky. National Opinion Research Center, Univ. Chicago. March 1961. 91 pp. and 171 pp. Sponsoring Agency: Air Research and Development Command, USAF, Wright-Patterson AFB, Ohio.

8. Sociological studies in scale analysis. M. W. Riley et al. Rutgers Univ. New Brunswick, N.J. 1954. 433 pp. See especially Chapter XII, A rapid scoring procedure for scaling attitude questions, by R. N. Ford. pp. 273-306.

9. A rapid machine procedure for determining scalability of any number of questions. J. N. Ake. Public Opinion Quarterly. 26:121-125. Spring 1962.

10. Some principles of mass persuasion. D. Cartwright. Human Relations. 2:253-267. 1949.

11. Some reasons why information campaigns fail. H. H. Hyman and P. B. Sheatsley. Public Opinion Quarterly. 11:412-23. Fall 1947.

12. The Erie County air pollution pulmonary function study: Study design and selected preliminary findings. W. Winkelstein, Jr. and I. deGroot. Am. Rev. Resp. Dis. 86(6):902. 1962.

13. The growth of the city. In: The City. R. E. Park, ed. Univ. Chicago Press, Chicago, Ill. 1925. pp. 47-62.

14. Social class and modes of communication. L. Schatzman and A. Straus. Am. J. Sociology. 60:329-38. Jan. 1955.

15. Odor and fallout control in a Kraft pulp mill. G. A. Hansen. JAPCA. 12:409-13. Sept. 1962.

16. Evaluation of odor nuisance in the manufacture of Kraft paper. J. M. Dallavalle and H. C. Dudley. Public Health Reports. 54:35-43. Jan. 1939.

17. Animal species and evolution. E. Mayr. Harvard Univ. Press, Cambridge, Mass., 1963. p. 242 ff.

APPENDIX A

SURVEY QUESTIONNAIRE

Budget Bureau No: 68-6214
Approval Expires: Sept. 30, 1962

CLARKSTON PUBLIC OPINION SURVEY

Conducted by

Research Triangle Institute
P. O. Box 490
Durham, North Carolina

Sponsored jointly by

Division of Air Pollution, Public Health
Service, Department of Health,
Education, and Welfare

Washington State Department of Health
and
City of Clarkston, Washington

IDENTIFICATION

1) Address ________________________________

2) Sampling Unit No. _______

3) Household No. __________

4) Sex of Respondent:

a. Male ________

b. Female ______

5) Interviewer:

____

RECORD OF VISITS

Date	Interview time		Time of day (if no contact)
	Began	Ended	
			a.m. p.m.
			a.m. p.m.
			a.m. p.m.

HOUSEHOLD INFORMATION

Household Member	No. in HH	Sex	Age	Education	Occupation	Employer
HEAD						
	XX					

ALL INFORMATION WILL BE HELD IN STRICT CONFIDENCE.

1. In general, how would you rate Clarkston as a place to live? Would you rate it:

EXCELLENT ______________

GOOD ______________

FAIR ______________

POOR ______________

VERY POOR ______________

DON'T KNOW ______________

(If "EXCELLENT, GOOD, or FAIR," ask Questions 2 and 3 in order; if "POOR, VERY POOR, or DON'T KNOW," ask Question 3 and then Question 2. Start first question asked with "What are some of the things," next question with "Are there some things.")

2. A. (What are some of the things
Are there some things) you like about living in Clarkston, things that you think are advantages or that make this a good place to live?

____

____

____

B. Have we overlooked anything? ______________________

____

3. A. (What are some of the things
Are there some things) you don't like about living in Clarkston, things that you think are disadvantages?

____

____

____

B. Have we overlooked anything? ______________________

____

____

4. A. In what year did you move to Clarkston?____________________

B. Where was your last place of residence before moving to Clarkston?

______________________ ______________________________
(City or County) (State)

5. A. Since living in Clarkston, have you ever moved from one neighborhood to another?

YES_____ NO_____

If YES, For what reason?________________________________

____

Any other?____

B. Have you ever thought of moving from this neighborhood to another in this area?

YES_____ NO_____

If YES, For what reason?________________________________

____

Any other?____

C. Have you ever thought of moving to some city or town outside this area?

YES_____ NO_____

If YES, For what reason?________________________________

____

Any other?____

6. Do you believe Clarkston has any health problems that need correction?

YES_____ NO_____ DON'T KNOW_____

If YES, What problems?____________________________________

____

____

7. How would you rate your health at the present time?

Very Poor___ Poor___ Fair___ Good___ Excellent___

8. Do you ever worry about your health? YES___ NO___

If YES, How frequently? Often___ Sometimes___ Hardly Ever___

9. Here are a few problems which different communities are facing. How would you rate each of these for Clarkston today in terms of serious, somewhat serious, or not serious?

	Serious	Somewhat Serious	Not Serious	Don't Know
(a) Outbreaks of contagious diseases such as whooping cough, diphtheria, *etc.*	___	___	___	___
(b) Water pollution	___	___	___	___
(c) Air pollution	___	___	___	___

10. Have you ever thought of requesting some authority or agency to take action concerning any of these problems?

YES___ NO___

If YES, (a) What problems?___

___

(b) Have you ever actually made such a request?

YES___ NO___

If YES, To whom did you make the request?___

___

11. Do you think there is air pollution in Clarkston at any time during the year?

YES___ NO___

(If NO, skip to Question 19.)

12. When did you first notice air pollution in Clarkston?___

___

13. Which one of these statements applies to you? (CARD A)

Since living in Clarkston

	CHECK ONE
(a) I have not been bothered by air pollution.	________
(b) I have been somewhat bothered by air pollution.	________
(c) I have been bothered quite a lot by air pollution.	________

If (b) or (c), A. Has air pollution bothered you more, about the same, or less each year?

More____ About the same____ Less____

B. In what season are you bothered by air pollution? *(Check all that apply.)*

Winter____ Spring____ Summer____ Fall____

14. Do you believe that air pollution in Clarkston

	CHECK ONE
(a) Cannot be reduced below its present level?	________
(b) Can be reduced below its present level?	________
(c) Can be almost completely eliminated?	________

15. What do you think are the major sources of air pollution in this area? (List in order of importance.)

____

____

Any other? ____

16. Which one of these statements do you think best describes the effort ________________ is making to control air pollution in this area? (CARD B)

	Source 1	Source 2
(a) No effort to control air pollution.	______	______
(b) Very little effort to control air pollution.	______	______
(c) Some effort to control air pollution, but not as much as it should.	______	______
(d) A great deal of effort to control air pollution.	______	______
(e) Don't know.	______	______

17. Do you worry about the effects of air pollution on your health?

YES____ NO____

If YES, How often? Sometimes______ Frequently______
Almost never______

18. Do you worry about the effects of air pollution on your property?

YES____ NO____

If YES, How often? Sometimes______ Frequently______
Almost never______

19. How do you think (local doctors), (local papers), (major local industries) feel about air pollution in this area? (CARD C)

	Local Doctors	Local Papers	Major Local Industries
(a) They feel there is no air pollution in this area.	______	______	______
(b) They feel there is air pollution here, but they think it is not a serious problem.	______	______	______
(c) They feel air pollution is a serious problem here.	______	______	______
(d) Don't know.	______	______	______

20. What do you think the words "air pollution" mean to most people in this area? Do they mean:

	Yes	No	Don't Know
(a) Frequent bad smells in the air?	____	____	____
(b) Too much dirt and dust in the air?	____	____	____
(c) Frequent haze or fog in the air?	____	____	____
(d) Frequent irritation of the eyes?	____	____	____
(e) Frequent nose or throat irritation?	____	____	____

(f) Other__________________________

21. Which one of these statements do you think best describes the situation in this area in recent years? (CARD D)

	CHECK ONE
(a) Air pollution has not been a serious problem for this area.	________
(b) Air pollution has become a more serious problem each year for this area.	________
(c) Air pollution has become a less serious problem each year for this area.	________
(d) Air pollution has continuously been a serious problem for this area.	________

22. What do you think is the most important thing people should do about air pollution where it exists? What is the next most important thing? (CARD E)

	Most Important	Next Most Important
(a) Put their minds on their work instead of on imagined or minor annoyances.	___	___
(b) Support the efforts which industry is making to eliminate air pollution.	___	___
(c) Ask their elected officials for effective controls on air pollution.	___	___
(d) Try to get more information on the subject.	___	___
(e) Other____________________	___	___

23. One final question: Have you read or seen anything in the newspapers recently about air pollution?

YES___ NO___

If YES, What was it?______________________________

____

____

Interviewer's Comments

A. Respondent's understanding of questionnaire: If you feel that respondent had POOR UNDERSTANDING of the questionnaire (i.e., you had to explain a great many of the items), check below: ________

B. Respondent's interest in subject of air pollution:

HIGH	(respondent made spontaneous comments about air pollution; seemed to want to talk about it)	________
AVERAGE	(respondent answered questions without being pushed, but didn't volunteer information)	________
LOW	(respondent didn't want to talk about air pollution -- you had to drag answers from him)	________

APPENDIX B

DESCRIPTION OF SAMPLING PROCEDURE

An area probability sample of approximately 100 households* in Clarkston, Washington, was designed for this study. The decision to limit the sample size to 100 interviews was based on two factors, the allowable sampling error and cost. The size of the budget necessarily limited the total sample. It was known in advance, however, that sample estimates of the proportion of households in Clarkston with a particular characteristic or attribute would have absolute standard errors less than 0.06 for the most part with this sample size and sample design. This magnitude of error was considered acceptable for the purpose of the study.

The sample design is described technically as a stratified random sample of equal sized geographic strata. Since a complete list of the households in Clarkston was not available, an area sampling frame was constructed. Briefly, this was accomplished by first dividing the total eligible area into a large number of small areas or segments on a map. Each segment had boundaries that could be readily identified in the field. For the most part, the segments were city blocks bounded by streets. Second, a preliminary measure of the number of houses in each segment (or block) was obtained by counting on an aerial photo of the city. This count indicated a total of 2, 462 houses at the time the photo was taken. The resulting list of segments, together with the rough count of houses in each, constituted a frame from which a number of different sample designs could be constructed.

For this survey, the sampling unit was defined to be a cluster of approximately 5 households located within an area segment. The city of Clarkston was assigned a total of 500 sampling units. Using the photo count data as a measure of size, we assigned one or more of these 500 sampling units to each of the segments. Thus, a segment with a photo count of 17 houses was assigned 3 sampling units; a segment with a photo count of 9 was assigned 2 sampling units, etc. The exact assignment procedure employed the average photo count per sampling unit, namely 2462/500 or 4.924.

A total of 10 geographic strata containing 50 sampling units each were then constructed by grouping contiguous segments. Two sampling units were then selected with equal probability and without replacement from each stratum for the sample by drawing two different random numbers between 1 and 50 for each stratum.

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* A household includes all of the persons, without regard to relationship, living together with common housekeeping arrangements in the same house, apartment or other groups of rooms, or room, that constitute a dwelling. Institutions, large rooming houses, hotels, etc. were not counted as households.

The sample segments containing the selected sampling units were then visited and detailed sketches prepared indicating the location of each house along with its street number. It was then possible to delineate the sampling units in each sample segment and determine the cluster of households selected. For example, a sample segment with 3 sampling units and 20 actual houses was divided into 3 clusters of 7, 7, and 6 houses each and the selected sampling unit delineated on the sketch. These sketches were used by the interviewers to locate the sample households.

In summary, the sample is characterized by the following:

Number of universe (Clarkston) sampling units = 500
Average photo count per sampling unit = 2462/500 = 4.924 houses
Number of strata = 10
Number of universe sampling units per stratum = 50
Number of sampling units in the sample = 2 x 10 = 20
Sampling rate in each stratum = 2/50 = 1/25
Overall sampling rate = 20/500 = 1/25

A single interview was to be completed in each sample household either with the head of the household (principal breadwinner) or the spouse with approximately equal frequency. A total of 120 households were designated for interview. Interviews were completed in 104 of these households.

APPENDIX C

MANUAL OF INSTRUCTIONS FOR INTERVIEWERS

A. Purpose of the Study

The problem of air pollution has become increasingly important in recent years. Individuals living in areas where there is air pollution know that it can be a nuisance as well as an expense, and they are familiar with the discomfort it can cause. In order to know what measures need to be taken to solve the problem, authorities must know the manner in which the community conceives of air pollution in terms of seriousness of the problem, effects of air pollution on health and property, and knowledge of the nature and sources of air pollution.

The purpose of the study, therefore, is to obtain general and specific data concerning the opinions of the residents of Clarkston on air pollution.

Your job is a very important one because the success of the local health programs and the success of the survey may well depend upon the accuracy of the information you supply. Certainly the results of the investigation will be of little value if you fail to do your job well. Remember that interviewing is just as important a link as any other in the chain of the survey process. Study this manual well so that your interviews can be conducted courteously, accurately, and expeditiously.

B. Definition of Terms

The terms included here are those generally concerned with the survey process and are used throughout the manual.

1. Call-back

By call-back will be meant the return visit to a sample household where an interview could not be completed on the first call. Call-backs will be made at least twice (three visits in all) before classifying the household as not available for interviewing. The three calls should be made at different times of the day.

2. Dwelling Unit (DU)

A dwelling unit is defined as the living quarters occupied by, or intended for occupancy by, one household. It is to be distinguished from the structure which may contain one or more dwelling units and hence, one or more households. For example, an apartment house consists of several dwelling units in one building. A dwelling unit may be a detached house, an apartment in a large building, or rooms in a structure primarily devoted to business or other non-residential purposes.

3. Household (HH)

A household includes all of the persons, without regard to relationship, living together with common housekeeping arrangements in the same house, apartment or other groups of rooms, or room, that constitute a dwelling unit. Institutions, large rooming houses, etc., are not counted as households.

4. Head of Household

The head of the household is defined as the principal breadwinner of the household.

5. Interviewer

The interviewer is the agent of those persons conducting the survey, and is the person who obtains the information from the respondent by a personal interview.

6. Questionnaire

The questionnaire is the form which contains the specific questions to be asked during the interview. The pertinent information received from the respondent is recorded on the questionnaire.

7. Random Number

Any number selected at random (purely by chance) from all numbers up to a designated one is a random number. Random numbers have been used to select the sampling units for the sample.

8. Respondent

A respondent is the person who is questioned by the interviewer. There will be one respondent for each family. In most cases the respondent will be specified.

9. Sampling Unit

A sampling unit is that combination of dwelling units which has been selected at random to comprise the sample. All households within the dwelling units comprising the sampling unit are to be interviewed if they are defined as in (3). In most cases a sampling unit will be designated on a sketch showing addresses. In some cases, no addresses are given but a specific lot is located. In this case, interviews should be conducted with occupants of all dwelling units on that lot.

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C. Materials Provided

1. Maps showing the general area of the city to be visited.
2. Sketch maps showing the exact location of the dwelling units in the sample.
3. Manual of Interviewer's Instructions.
4. Questionnaires.
5. A set of five flash cards, A through E, for use with questionnaire.
6. Identification.
7. Expansion envelopes.
8. Clip board.
9. Pencil and pencil sharpener.

D. Plan of the Study

The method of collecting the data for this study is known as a sample survey. Using scientific sampling techniques we have endeavored to give every household within the defined geographic limits of the survey an equal chance to provide us with information about their opinion on air pollution. Although only a small proportion of the households have actually been chosen for the sample, the design used will enable us:

1. To estimate the proportions of the universe of Clarkston who are disturbed by air pollution.

2. To determine the public's opinion concerning the source and severity of the problem.

3. To determine the public's opinion concerning the effects of pollution on health and property.

4. To determine to some extent the geographic distribution of those disturbed by air pollution.

5. To establish relationships of concern about air pollution to a few personal characteristics.

The sample design is such that we have not selected certain groups or certain households in preference to others; we have not, for example, selected low income families rather than high income. The sample, having been selected at random from all households in the universe, will have all groups represented in their proper proportion. The particular households which you, as an individual, will interview may not appear to be representative of the locality or the city. Please remember that the sample as a whole will represent the city and your part is essential to complete the picture.

Although we are using what is known as an area sampling procedure, we have endeavored to construct the size of the area segment (sampling unit) such that each sampling unit will contain, on the average, about five households.

As stated above, the inquiry will cover a cross section of households in the city of Clarkston. The sampling units have been distributed proportionately over the city. A total of 20 sampling units have thus been selected and designated.

The point should also be made that sampling is a "delicate" job. When we interview approximately 100 households and use the sample figures to estimate what we would find had we visited all the households in the universe, it becomes clear that accurate interviewing of every household in the sample is important. Small mistakes in a sample become large mistakes in the expanded results.

You will be given a questionnaire which tells you what to ask and gives space to record replies. Your skill in getting the information and your accuracy in recording it will determine to a large extent the reliability of the report that comes from this study.

E. Field Procedures

For your assignment you will be given a list of the sampling units you are to visit, and sketch maps corresponding to the list. The sampling units will be identified by a number, and each dwelling unit within the sampling unit will be labelled with a number. This number is called the household number and will be placed on the questionnaire along with the sampling unit number to identify each questionnaire. All maps will show the names of the street boundaries for every block in which a sampling unit falls. The location of the sampling units within the block will also be shown.

On most of the maps, house numbers will be given. First locate the sample dwelling units by examining the maps, and then compare the house number on the house with that given. If they agree, you can be fairly sure that you have the right dwelling units. If they disagree, re-examine your map to be sure no mistake was made. If you are unable to determine the sampling unit, consult your supervisor.

In addition to the household number, each dwelling unit on the sketch map will be labelled M (male) or F (female), indicating the respondent for that household, if the household contains a married couple. If it is a two or more couple household, take the head of the household or his spouse, depending on the sex specified. In households with no couple, the head will be interviewed in all cases, ignoring the M or F label assigned to the dwelling unit. If the person specified for interview is not available on the first call, try to determine when he or she will be home and plan your call-backs accordingly.

Should you find that what is indicated on the sketch map as one dwelling unit is actually more than one, interview one respondent in each dwelling unit, beginning with the sex indicated and alternating. Any large multiple dwelling unit or unusual situation should be reported to your supervisor.

A total of three calls will be made at each dwelling. If contact is not made on the first call, plan your next call for a different time of the day. If after two calls at different times of the day, contact still has not been made, chances are that the occupants work and an evening would be a better time to find someone at home. If after three calls at various times contact has not been made, mark the questionnaire "No Contact" and turn it in, with the sampling unit number and household number specified.

F. Conducting an Interview

Preliminaries. -- Interviewing involves much more than reading off a series of questions and recording answers. Before you can even start in with the questions you must establish a friendly but business-like relationship with the respondent. Begin by introducing yourself, giving your name and the names of the sponsors of this study, as: "Good (Morning, Afternoon, Evening). My name is ________________ I am working with the Research Triangle Institute as an employee of the Washington State Department of Health. We are conducting a survey regarding certain health conditions in Clarkston. To do this we need help from the residents of the city. May I speak to the (lady, man) of the house for a few minutes?" Show your identification if the family needs assurance that you are what you represent yourself to be and that this is a bona fide survey.

Next explain why you are there, suiting the wording of your explanation to the understanding of your respondent. Make clear that cooperation is voluntary, but that it is very important to the success of the project that every family in the sample cooperates. If they don't, we will not have a cross section of the population and our data may not be representative. Assure your respondent that the information will be considered strictly confidential.

Many respondents are flattered to think that they have been chosen to be included in a survey. Most show no curiosity as to how the selection has been made, but occasionally a respondent will ask how or why his family was chosen. You can explain that a representative cross section of the city is being interviewed; that to get this cross section the city was divided into small areas in which all dwellings are being visited. Stress the fact that the information obtained from the study will not give a true picture of the city unless all families who are asked for information cooperate.

The interview. -- The length of time you spend in explaining the purpose of the study, in assuring your respondent of the confidential nature of the study, and in outlining the types of information you will be talking about varies with the respondent. You will soon learn to know how far you need to go with explanations, and when the respondent is ready for you to begin asking questions.

Be prepared to have the respondent stop the interview with questions about how the information he is giving you will be used, why he instead of his neighbor was chosen, etc. Repeat -- using slightly different words -- what you may have already told him, or explain in greater detail the points that seem to bother him. Reassure him that the information he gives is confidential.

Begin the interview in whichever room suits the respondent, or outside if the weather is suitable and there is a comfortable place to sit. It is often possible to conduct the interview while the homemaker continues with her ironing or sewing or cooking.

Generally speaking, you will want to conduct the interview when the respondent is alone, but husband/wife and children or other close members of the family group cannot be chased away. The presence of neighbors, inlaws, etc., tends to affect the freedom with which people respond to questions. It also seems to be a contradiction to your statement that this is a confidential survey. Whenever you sense that the third person is making your respondent uncomfortable, suggest that you make an appointment at a later time.

It is up to you to set the pace of the interview. The respondent expects this since you requested the interview and are the one who knows the business to be done. A respondent may talk a great deal because he feels uneasy or embarrassed or because you are too slow. It is well to move on to the next question as soon as he has given an answer, unless you have some doubts either of his understanding of the question or of your understanding of his reply. If you hurry him too much, however, the respondent may become confused and lose interest.

Don't get so buried in the schedule that you forget to look at your respondent now and then. He is watching you, too, and will be alert to any reactions you show to his answers. Strive hard to maintain a friendly but business-like and non-committal attitude throughout the interview. Ask about each item without emphasis or show of curiosity and do not show any reaction to the replies you receive. **DO NOT DISCUSS YOUR OWN ATTITUDES** on any of the matters covered in the schedule.

In general, the questions should be asked in the form in which they appear on the schedule. On occasion you will want to preface a question with another question leading up to it. When you do use wording different from that in the schedule, be sure not to ask "leading" questions. By that we mean questions that invite a certain answer or make it easier to reply in one way than in other possible ways.

You will probably get the answer "I don't know" quite frequently.

You will soon recognize that sometimes the respondent really means he doesn't know, but other times he simply means that your question requires thinking about and he feels he has to say something to fill the time while he thinks. In the latter case give him the time he needs to pull his thoughts together.

In research work of this kind each schedule is of equal importance in what it contributes to the whole picture. Give as careful attention to the lower income family as to the prosperous family, to the poor housekeeper as to the "neat-as-a-pin" type. To get equally good schedules from all respondents, you must recognize your own prejudices, whatever they may be, and keep from revealing them. As soon as you let it be known that you disapprove of something about your respondent, you will jeopardize the truthfulness and completeness of the information he gives.

Concluding the interview. -- After you have finished asking all the questions on the schedule, look it over quickly to see if you have omitted anything. You may have turned two pages at a time, or skipped some items when you had an interruption. Complete any omitted items, then thank the respondent for his time and cooperation. Leave him feeling friendly toward you and the sponsors of this survey. Make him feel that his time has been well spent and that he has made a useful contribution.

Reviewing the schedule

As soon as possible after each schedule is taken, go over it to make sure that every entry is complete, and that there is an entry for every item. Do this while the interview is fresh in your mind. Turn completed work in to your supervisor promptly.

Refusals

Actual refusals are rare. We have found that most families are friendly and willing to cooperate. Perhaps only 5 people out of 100 will refuse to give a schedule. It is quite likely, therefore, that you will not experience a refusal. A few words on the subject are in order, however, so that you will know how to handle the situation.

First, a refusal is not necessarily a reflection on you as an interviewer. Even the best interviewers experience an occasional refusal. On the other hand, one of the marks of a good interviewer is a low refusal rate.

Secondly, don't let a refusal, should you meet with one, influence your attitude. Nothing will bring on a refusal faster than an apologetic approach. It is important that you meet your respondent with a friendly, confident air.

Refusals may occur for many reasons. The person who refuses may have had a bad experience on another occasion when his confidence was violated. He may be in a bad mood that day and be ready to say "no" to any proposition. He may feel that giving the interview will serve no useful purpose. In any case, listen to what he has to say. People are frequently willing to change their tune once they have gotten something that rankles off their chest. Don't argue. Be noncommittal but sympathetic and you may win over a person who started out to be uncooperative.

A respondent may say that he is too busy to take time for an interview. Most of us will try to get out of work if we can. In such cases, try to get the interview started. Once it is started, most people will go through with it.

You may find some respondents who would like to refuse but are too polite to do so. In this situation, your best course of action is to get the interview started and keep it going. Try not to have to make an appointment to do or complete an interview at a later time if you feel that your respondent is antagonistic. Such a person will frequently "refuse" by failing to keep an appointment.

G. Questionnaire

1. General Instructions

a. All sentences in parentheses are directions for the interviewer.

b. There are five questions which use cards for the respondent's answer. These cards are lettered A - E and are to be used as instructed in the questionnaire. They are not to be read to the respondent unless he cannot read. They should be handed to the respondent for his own perusal. Ask only for the number or letter next to the statement which best describes his answer. If he gives the statement, ask what the number or letter for that statement is.

c. Be sure to read the questions exactly as they are written. Try to memorize them so that your manner will be natural, but do not change the wording. These questions have been carefully written to insure maximum accuracy and standardization. Speak slowly and distinctly.

d. An attempt has been made to provide answer blanks for every possible response. When there is not enough space to record an answer, use the back of the previous page, making sure the question number identifies the answer.

e. Where the questions are self-explanatory, no further instruction is given.

f. Never read the respondent a "Don't Know" answer. If he gives you that answer, and after a pause and possible rewording of the question he insists he doesn't know, record it as such. If there is not a place to check "Don't Know," write it on the questionnaire.

2. Specific Instructions

a. IDENTIFICATION (cover page)

2) Sampling Unit Number - Enter the number that appears on the sketch map.

3) Household Number - Enter the number assigned to the dwelling unit on the sketch map.

b. RECORD OF VISITS (cover page)

Enter the date of each call in the space provided. If you have to make more than one call to find someone at home, enter the time of day of each visit. Record the time interview begins and ends in the space provided.

c. HOUSEHOLD INFORMATION

To be filled for the head of the household and his spouse, if for a household with a married couple. To be filled for the head only if no couple resides in the dwelling unit. The education space should show the last grade completed; college should be indicated by 13, 14, 15, etc. Be sure to specify the type of work under occupation; for instance, machine operator, sales clerk, milk route driver, etc., not just operator, clerk, truck driver. Give the name of employer and kind of place employed; for example, grain store, insurance office, pottery factory, etc.

d. Questions:

1. Do not read answers to respondent unless you are unable to categorize his reply.

2 and 3. Note instruction on questionnaire in regard to order of questions 2 and 3. Use short phrase description of areas mentioned by respondent; for example, taxes, cost of living, climate, poor shopping facilities, etc.

4A and 4B. If respondent has lived in Clarkston all his life, enter NA (not applicable) in answer blank.

5A. This refers to Clarkston only.

5B. "in this area" refers to the Lewiston-Clarkston area, not just Clarkston.

5C. This refers to any city outside the Lewiston-Clarkston area.

9. One and only one check should be made for each item.

10. Refers to problems listed in 9.

11. If respondent has mentioned air pollution as a problem in either 9 or 10, it is not necessary to ask question 11. Check "Yes" and continue to question 12.

12. Year should be specified.

13. Hand respondent Card A and check the answer given. If (b) or (c), is given as an answer, ask A. and B.

14. Read the three answers to the respondent and record the answer.

15. "in this area" refers to the Lewiston-Clarkston area.

16. Hand respondent Card B and ask question 16 for each source listed in question 15. For instance, if the city dump is mentioned in 15, the question should read, "Which one of these statements do you think best describes the effort Clarkston is making to control air pollution in this area?" Ask the question separately for each source and record the answer. If more than two sources are listed, extend the lines by each answer and check in the margin.

19. Hand respondent Card C and ask the question separately for the three items in parentheses. Check one answer for each item under the proper column.

20. Read items (a) through (e) and check "Yes" or "No" for each item. If respondent volunteers any other answers, write them in the space provided.

21. Hand respondent Card D and check answer. If respondent has not lived in Clarkston long enough to answer the question, make a note of this on the questionnaire.

22. Hand respondent Card E, record first answer given by making one check in Most Important column, and record second answer by making one check in Next Most Important column. If respondent volunteers an answer not listed, record it in space provided and check appropriate column.

APPENDIX D

INTERVIEWERS SUGGESTED REVISIONS OF SURVEY QUESTIONNAIRE

The following suggestions regarding the interview schedule are the result of a critique held by the four interviewers the week following the opinion survey in Clarkston, Washington:

A. Record of visits: Another column showing appointment time when pre-selected interviewee would be available could be added.

B. Household information: This could be put last. We had several interviewees that balked at giving age. It was skipped until rest of interview was over, then respondent was willing to answer questions.

C. Education: Should Business school and/or Nursing school be counted year for year as years of education past High School?

D. Employer: Should be labeled "type of industry" as given in manual.

E. Questions 2B, 3B: "Is there anything else" was preferred to the more awkward expression of "overlooked."

F. Questions 4A and B: If last move was from Lewiston - we felt that information should show last residence outside Lewiston-Clarkston area, since moving from Lewiston was much like moving from another neighborhood which was covered in another question.

G. Question 6: Might be worded "problems that might affect health" - (a minority opinion).

H. Question 8: Many respondents said "They never worried since that didn't do any good"; they did seem to be concerned. (Frequency was difficult to determine.)

I. Questions 9(a)(b)(c): Items (a)(b) and (c) had to be asked as three separate questions, since the respondent would forget response categories as items (b) and (c) were asked. Item (b): A number of respondents asked if we meant "drinking water" or "pollution of the river."

J. Question 10: Many respondents said "No, because it wouldn't do any good." Which implies that they might have considered making such a request. This was coded - No.

K. Question 11: Did "anytime" mean not seasonal or can be found at least once during the year?

L. Question 13B: Should read, "In which season or seasons. . ."

M. Question 14: Should be shortened (eliminate - "below its present level") or put question on a card.

N. Question 15: We felt that since most respondents had already mentioned the "mill" that we had to say "now you have already mentioned the mill as a source of pollution - would you consider it a major source?" -- what are others?

This question might read: What is major source ---
What is next greatest source ---
Any other ---

This ordering would have lead directly to question #16.

O. It was difficult to determine who should be controlling sources such as auto exhaust in Clarkston.

P. Questions 17 and 18: See criticism of question #8.

Q. Question 20: Should read: "What conditions do you (or neighbors) associate with air pollution?" Most respondents insisted on giving personal feelings unless they were continually reminded that we wanted opinions of other people in the area, and this was not always effective.

R. Question 21: Many respondents did not like the word "serious" in these responses. There is no category for "no problem" or "has never been a problem."

S. Question 22A: Is too strongly worded - evoked laughter in many cases. One respondent answered 22D was first, but could not answer "next most important" until proper information was found.

T. Question 23: Many respondents asked what we meant by "recently."

U. Evaluation item B: Many respondents appeared to fall between High and Average. Could use one or two more categories.

While the above suggested changes were not considered critical in evaluation of the data collected during this survey, the interviewers did feel that incorporation of at least some of them in the schedule would make the interview process run more smoothly and furnish less ambiguous responses.

APPENDIX E

INTERVIEWER'S COMMENTS

COMMENTS OF INTERVIEWER #1

(a) The pre-survey instructions were that emphasis was to be placed on the subject of "health conditions in general." I followed these instructions in all cases. Never did I act as if the interview pertained to air pollution.

(b) In approximately four or five cases the subject responded to my opening statement by asking whether the interview pertained to Potlatch Forest Industries or to air pollution. This question was asked before I was offered admittance in these cases. I re-emphasized that we were interested in all health conditions not necessarily air pollution, but if they thought that it did exist we were interested. Usually my opinion of the subjects' opening query was that if the survey did pertain to air pollution they were not interested. I therefore tried to act as disinterested as possible in the matter at that particular point in the interview situation.

(c) In all cases, contrary to my first opinion of the subject, the subject would be the first to bring up the matter of air pollution. I therefore did not have to re-structure the interview in order to not arouse suspicion. The only situation that approached a re-structure was my opening assurance that the survey was a general health survey.

(d) I think the above statement would negate any answer to this question. The subjects were the first to bring up the matter of air pollution and usually discussed the matter at will.

COMMENTS OF INTERVIEWER #2

Introduction of the interview was dictated by interview instructions and I attempted to use the exact wording given in the manual. Some stress was placed on the fact that I was from the Washington State Department of Health, but this was for the purpose of gaining admittance. If air pollution was mentioned, I attempted to act as if I was unaware of that particular problem in their community.

Wherever possible, nothing was added to the introduction since I felt that this might raise unnecessary questions. The only detailed explanations given concerned cases where the respondent did not wish to be "bothered." For these persons I attempted a general explanation of the sampling procedure designed by R.T.I. ("in North Carolina") and the need for an interview at a particular house.

In no case was the topic of air pollution introduced prior to its appropriate place in the questionnaire.

Most respondents accepted the above structuring without covert question (approximately 95 percent). Some of these who had not mentioned air pollution previously expressed "sudden discovery" of why we were there when I did finally mention air pollution as a possible health problem. Approximately 5 percent continued to insist that the interview was for the purpose of finding out how they felt about air pollution as a health problem.

For the above five percent, I just repeated that we wanted opinions on anything the respondent might feel was a health problem in the community. If the respondent continued to insist that the primary focus was air pollution, I again repeated the above declaration that this was a survey concerning all health conditions, and that the questionnaire had been "made up" by R.T.I. in North Carolina, and the completed questionnaires would be sent to Cincinnati for processing by I.B.M. equipment - no one in Clarkston would see them, and the results would be reported as "so many percent think this is a problem and so many percent think that is a problem, etc."

I had a definite feeling that at this point most of the five percent skeptics were convinced that we really wanted their opinion on all health problems in the community. Some of these reverted back when we got into specific questions about air pollution, but I had no refusals to answer questions by that time.

COMMENTS OF INTERVIEWER #3

We were instructed to present the interview as one concerned with health conditions in general rather than air pollution in particular. I used the sentence given in the instructions, "We are conducting a survey regarding certain health conditions in Clarkston," almost verbatim at the beginning of each interview.

I recall only one lady that expressed an opinion at this point in the interview that the interview was going to be concerned primarily with air pollution.

As I remember, I said we were interested in her opinions of health conditions in Clarkston and that if she considered air pollution a health problem, we would certainly discuss it. I then asked and received her permission to begin the interview.

I cannot recall any effect the above preliminary conversation may have exerted upon the interview. The woman considered air pollution a health problem and quite readily expressed her opinions.

COMMENTS OF INTERVIEWER #4

(a) In introducing myself and explaining the interview, I always mentioned that I was from the Washington State Health Department and that we were conducting a "public opinion poll on the subject of health problems in the City of Clarkston." I also always mentioned that it was being done at the request of the City of Clarkston. Only two out of 25 people responded at this point with a mention of air pollution and both seemed to be really concerned with air pollution and its affect on health.

(b) Out of the approximately 25 people I interviewed, 3 seemed to know from the beginning that I would ask very specifically about air pollution. They had been apparently told by someone who had been interviewed previously.

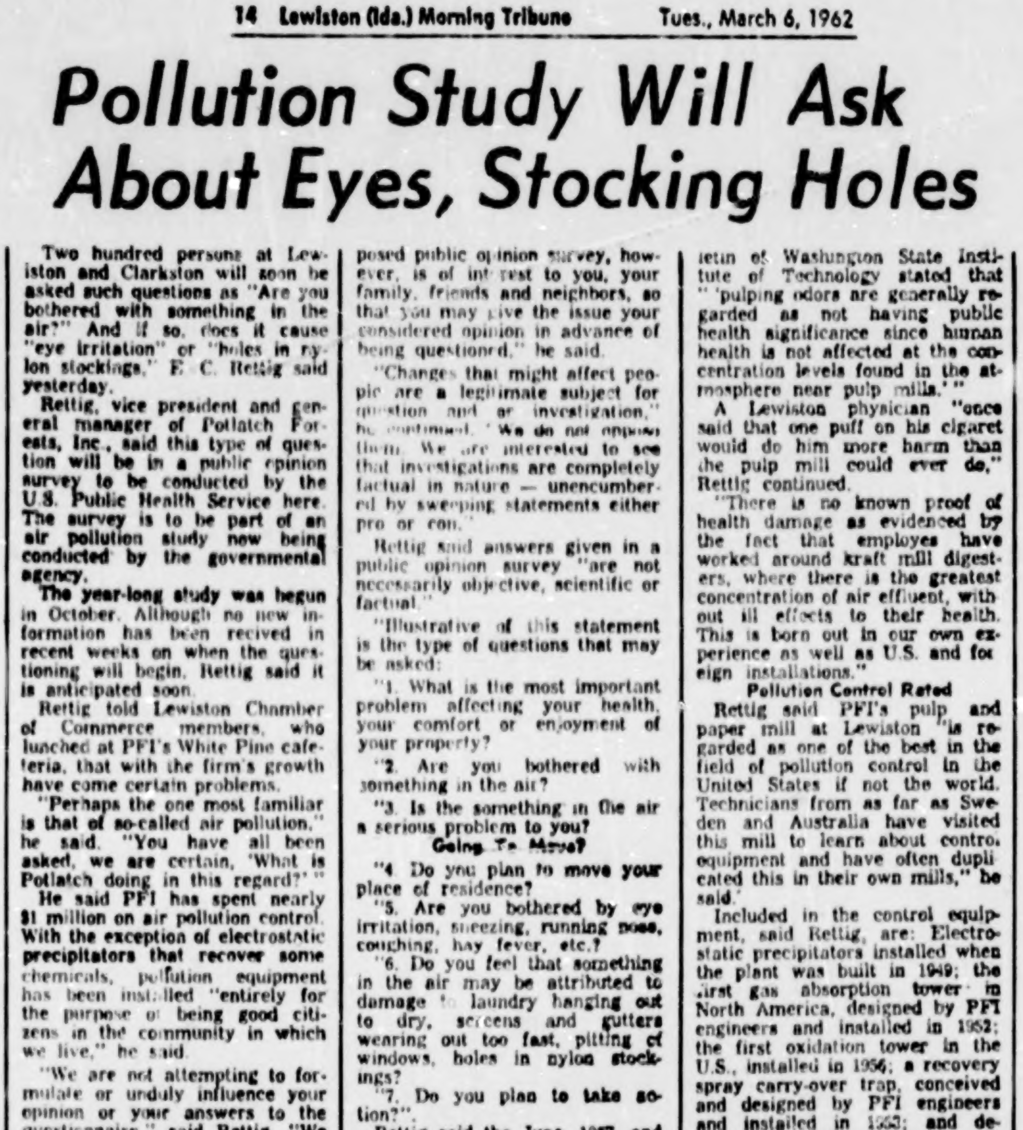
(c) I told each of the 3 that we were not concerned only with air pollution but with any and all health problems; but, that if air pollution is considered a problem we would ask questions about it.

(d) All three seemed to accept this explanation, and their answers and their attitudes did not seem to be different than most. When the subject of air pollution was brought up about half of the subjects were immediately reminded of previous activities by the "Health Department" and by Potlatch Forest Industries and either inquired if this study was related or mentioned the previous work but stated they didn't know much about the subject and thus couldn't help me. I answered this by saying that this was a "public opinion poll" and that "we wanted to know how people felt about the health problems in Clarkston."

In every case this explanation seemed to work and the subject tried to answer the questions.

APPENDIX F

CLIPPING FROM LEWISTON TRIBUNE, MARCH 6, 1962



14 Lewiston (Ida.) Morning Tribune Tues., March 6, 1962

Pollution Study Will Ask About Eyes, Stocking Holes

Two hundred persons at Lewiston and Clarkston will soon be asked such questions as "Are you bothered with something in the air?" And if so, does it cause "eye irritation" or "holes in nylon stockings," E. C. Rettig said yesterday.

Rettig, vice president and general manager of Potlatch Forests, Inc., said this type of question will be in a public opinion survey to be conducted by the U.S. Public Health Service here. The survey is to be part of an air pollution study now being conducted by the governmental agency.

The year-long study was begun in October. Although no new information has been recived in recent weeks on when the questioning will begin, Rettig said it is anticipated soon.

Rettig told Lewiston Chamber of Commerce members, who lunched at PFI's White Pine cafeteria, that with the firm's growth have come certain problems.

"Perhaps the one most familiar is that of so-called air pollution," he said. "You have all been asked, we are certain, 'What is Potlatch doing in this regard?' "

He said PFI has spent nearly $1 million on air pollution control. With the exception of electrostatic precipitators that recover some chemicals, pollution equipment has been installed "entirely for the purpose of being good citizens in the community in which we live," he said.

"We are not attempting to formulate or unduly influence your opinion or your answers to the questionnaire," said Rettig. "We feel that knowledge of the proposed public opinion survey, however, is of interest to you, your family, friends and neighbors, so that you may give the issue your considered opinion in advance of being questioned," he said.

"Changes that might affect people are a legitimate subject for question and or investigation," he continued. "We do not oppose them. We are interested to see that investigations are completely factual in nature — unencumbered by sweeping statements either pro or con."

Rettig said answers given in a public opinion survey "are not necessarily objective, scientific or factual."

"Illustrative of this statement is the type of questions that may be asked:

"1. What is the most important problem affecting your health, your comfort or enjoyment of your property?

"2. Are you bothered with something in the air?

"3. Is the something in the air a serious problem to you?

Going To Move?

"4. Do you plan to move your place of residence?

"5. Are you bothered by eye irritation, sneezing, running nose, coughing, hay fever, etc.?

"6. Do you feel that something in the air may be attributed to damage to laundry hanging out to dry, screens and gutters wearing out too fast, pitting of windows, holes in nylon stockings?

"7. Do you plan to take action?".

Rettig said the June, 1957, and December, 1961, issues of the bulletin of Washington State Institute of Technology stated that " 'pulping odors are generally regarded as not having public health significance since human health is not affected at the concentration levels found in the atmosphere near pulp mills.' "

A Lewiston physician "once said that one puff on his cigaret would do him more harm than the pulp mill could ever do," Rettig continued.

"There is no known proof of health damage as evidenced by the fact that employes have worked around kraft mill digesters, where there is the greatest concentration of air effluent, without ill effects to their health. This is born out in our own experience as well as U.S. and foreign installations."

Pollution Control Rated

Rettig said PFI's pulp and paper mill at Lewiston "is regarded as one of the best in the field of pollution control in the United States if not the world. Technicians from as far as Sweden and Australia have visited this mill to learn about control equipment and have often duplicated this in their own mills," he said.

Included in the control equipment, said Rettig, are: Electrostatic precipitators installed when the plant was built in 1949; the first gas absorption tower in North America, designed by PFI engineers and installed in 1952; the first oxidation tower in the U.S., installed in 1956; a recovery spray carry-over trap, conceived and designed by PFI engineers and installed in 1953; and demisters to further reduce air effluent, installed in 1959.

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APPENDIX G

CONTENT ANALYSIS OF NEWSPAPER CLIPPINGS

Introduction

This content analysis on air pollution is confined to newspaper items that appeared in the Lewiston-Clarkston newspapers from September of 1960 through May of 1962. News items were furnished to the office of the Chief of the Division of Air Pollution at Washington, D. C. by THE ROMEIKE PRESS CLIPPING SERVICE, which contracted to provide all news items containing air pollution content. Another set of news items covering the identical time and area was provided this office by the Technical Assistance Branch of the Division of Air Pollution of the United States Public Health Service (USPHS) at Cincinnati, Ohio.

The news items appearing prior to June, 1961, were identical for both the Cincinnati office and the Washington office, since the Cincinnati files were photostatic copies of the Washington files for this period. Eleven air pollution news items occurred in the period during which the files were identical. For the period June 1961 to May 1962, 26 different news items were recovered -- 17 from the Office of the Chief of the Division of Air Pollution and 9 from the Technical Assistance Branch. This procedure produced a 53 percent increase in the number of news items recovered during the period June 1961 to May 1962.

Although a total of 36 different news items was available from both sources, only 33 items were used in the actual analysis. Two categorical restrictions eliminated the other three items: First, in order to be considered for analysis, the item was required to have an air pollution headline; i.e., the news item had to identify itself as being primarily concerned with air pollution -- e.g., "One-Year Air Test Slated By Health Agency," and "Smog Course to Draw 150." If the item contained air pollution content, but did not identify itself as being primarily concerned with air pollution in the headline, the item was not used -- e.g., "Electronic Brain Puts PFI In Lead."

Secondly, the content of the news item containing an air pollution headline had to pertain to the Lewiston-Clarkston Valley. For instance, an editorial from THE NEW YORK TIMES entitled, "To Help Fight Smoke," was recovered from the LEWISTON TRIBUNE. Although there was air pollution content, the problems were indigenous to New York, not Lewiston-Clarkston; consequently the news item was not analyzed.

Since there is no available information as to the relative salience of air pollution news as compared with other types of local issues, no conclusions can be drawn regarding the degree of public concern with air pollution from analysis of local news items. Hence, this content analysis merely describes the way in which the air pollution issue was presented to the public without attempting to indicate its comparative position in competition with other local topics.

Synopsis of News Items

On October 6 and 7, 1960, a course in air pollution was conducted by the Taft Sanitary Engineering Center of the USPHS in cooperation with the University of Idaho Adult Education Center. Clarkston Mayor, Bill J. Courtney, and Chairman of the Clarkston Air Pollution Committee, Joe Tuschhoff, were delegated by the City Council to attend the meeting. In November, 1960, Mayor Courtney sent a letter to the Division of Air Pollution of the United States Public Health Service requesting that a study be made of the atmospheric conditions in the Lewiston-Clarkston Valley.

On June 5, 1961, Jean Schueneman, Chief of the Technical Assistance Branch of the Division of Air Pollution, arrived in Clarkston with a companion engineer "to get some preliminary ideas" about the extent of air pollution in the Lewiston-Clarkston Valley.

Dr. Richard Prindle, Deputy Chief of the Division of Air Pollution, arrived in Lewiston in mid-October 1961 to further investigate the need for an air pollution study in the area. At this time, Potlatch Forests, Incorporated (PFI), announced a grant of $25,000 to Washington State University scientists to perform a study on atmospheric conditions in the valley.

"One-year Health Service Air Study To Start November 6" appeared in half-inch headlines in the LEWISTON TRIBUNE on the morning of October 28, 1961. Periodic reports on the progress of the USPHS air pollution study appeared in the TRIBUNE throughout the remainder of the analytic period.

Concerning the Potlatch Industries study, an editorial commending PFI on its decision to sponsor air pollution research by Washington State University scientists appeared in the TRIBUNE on October 13, 1961, along with a 6-inch column news story. On the previous day, a 15-inch column story appeared describing the specific types of tests to be performed by the Washington research scientists.

As a rule, the PFI and the USPHS studies were treated independently as news items. Occasionally, however, material on both studies was included in a single news item. Lengthy column stories were devoted to the combined study efforts on two occasions.

Methodology

News items were analyzed in terms of two processes -- the air pollution process and the communication process.

Air Pollution Process

In the air pollution process, three major categories were established -- the source of the pollution, the pollutant itself, and the thing or activity affected. The task was to establish specific, mutually exclusive subcategories within each major category and then to analyze each news item in terms of these major and minor categories.

The final subcategories of the major category, source, were Potlatch Forest, Inc., vehicles, homes, dumps, incinerators, and non-specific. A non-specific entry occurred, for example, when the news item referred to a general area from which air pollution stemmed or where air pollution existed, but where the news item did not specify the source. Frequently, in a series of news items, the source was mentioned in the early news releases but was assumed to be understood in the later ones. In the latter cases, the source was entered as non-specific.

The final subcategories under the major category, pollutant, were soot, smoke, smog, odors, dust, dirt, sulfur, fumes, and general pollutants (a source or thing affected is mentioned but no specific pollutant).

The final subcategories of the major category, thing, or activity affected, were property, health, animal wildlife, uncultivated plant life, personal comfort, and non-specific (a pollutant is mentioned but no specific effect is indicated).

If a news item contained information that pertained to more than one subcategory within a major category, that subcategory received more than one entry, although other subcategories within a major category might receive only one entry. For example, in one news item under the major category, source, "industry," "vehicles," and "homes" were mentioned. Under the major category, pollutant, "smoke," "smog," and "fumes" were mentioned. Under the subcategory, thing or activity affected, only "health" was mentioned. Consequently, in the final tabulation for major categories, the totals for numbers of entries were dissimilar for each category summation.

Communication Process

The communication process was analyzed according to a modified Laswellian formula: "Who said what, about what agent, with what social response."

Four major categories were used to code the communication content: 1 - who made the statement; 2 - what was said; 3 - to whom or about whom was the statement made; and 4a - what social response was reported, 4b - what social response was indicated as needing action, and 4c - what cognitive definition of the situation was indicated.

The final subcategories of the major category, who made the statement, were: air pollution scientists (including state university scientists and research agency scientists, but not including scientists who act as officials of a municipality or state as, for example, a state health officer, who was classified as a city or state official, or USPHS scientists, who were coded as USPHS officials); citizens group leaders; PFI managers; USPHS personnel; state authorities (state health officers, state public health engineers, state air pollution committee members); and municipal officials (mayor, sanitarian, health engineer, health officer, air pollution committee members).

The final subcategories of the major category, to whom or about whom was the statement made, were municipal officials, PFI managers, air pollution scientists, public health officials, state officials, and citizens groups.

The final subcategories of the major category, what social response or action was taken, were 1) what needs were expressed, 2) what actions were attributed to an agent, and 3) what is the cognitive definition of the situation as expressed by various spokesmen. Subcategory 1 was further subcategorized as follows:

Present needs

1. Need more air pollution research.
2. Need to make more effort to control air pollution.
3. Need more restrictive air pollution legislation.

Subcategory 2 was further subcategorized as follows:

1. Contributed financially to air pollution control.
2. Was active participant in air pollution communication.
3. Was passive participant in air pollution communication.
4. Was recipient of air pollution honor.
5. Cooperated to reduce air pollution.
6. Is performing air pollution research.

In these subcategories, an active participant is defined as one who sponsored an air pollution conference, one who gave an address at an air pollution course, conference or some similar activity. A passive participant is defined as one who attends and listens, but who is not otherwise actively engaged in the operation of the conference or communication activity.

There was no attempt to further subcategorize subcategory 3, the cognitive definition of the air pollution situation.

The subcategories of subcategories 4a and 4b are referred to here as themes. These themes are analyzed in terms of the headline captions and in terms of the non-headline content appearing in the body of the news item. News body content that refers to the headline caption

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is treated as part of the headline analysis. For example, in the news item with the headline, "Valley Air Pollution Recognized As Serious, Mayor Declares," each remark made by the Mayor about the seriousness of air pollution, even though it is contained in the small type of the body of the news item, was treated as a headline theme. The body of the news item refers to all written symbols occurring in the news item, which are not part of the headline caption.

Non-headline theme analysis was restricted to the two strongest news treatments within the body of the news item. In this secondary and tertiary theme analysis, the space allotted the theme, rather than its position in the news item, determined the rank the theme received.

Twenty news items contained but one theme, twelve news items contained two themes and only two news items contained three or more themes.

In the major category, what is said, all statements fell into the gives-an-opinion or gives-information subcategory. A theme was placed in the information category when no attempt was made to evaluate the reported event. Contrarily, a theme was placed in the opinion category when an attempt had been made to evaluate the event or when a spokesman charged that there was a need for an agent to perform an action or to cease performing an action. For example, "Idaho Smog Course Draws 150" is classified as giving information. "Industry Has Responsibility to End Air Pollution," however, is classified as an opinion.

Analysis

The number of news items occuring each month, the number of column inches including headlines for each month, the type of news articles, and the percentage of each type of item are shown in Table G-1.

Three specific incidents accounted for 79 percent of the air pollution content from the period September 1960 to May 1962. The subject accorded the most extensive treatment was the air pollution study performed by the USPHS. Coverage was completely restricted to the period June 1961 to May 1962 with June alone accounting for 20 percent of the total news linage analyzed. Altogether, the USPHS study accounted for 55 percent of the total air pollution linage during the period covered by this analysis.

The Potlatch Forests study was accorded the second highest news priority. This study accounted for 15 percent of the total air pollution linage. The news about the PFI study appeared primarily during the 3-month period from October 1961 to December 1961.

An air pollution conference was accorded the third highest priority. This material was concentrated into a 1-month period from mid-September 1960 to mid-October 1960. The conference accounted for 15 percent of the total air pollution linage.

Table G-1. DISTRIBUTION OF NEWS ITEMS ON AIR POLLUTION

YEAR	MONTH	COLUMN INCHES	% OF TOTAL LINAGE	EDITORIAL	NEWS ITEM	COLUMN STORY	LETTER TO EDITOR	% OF COLUMN STORY
1960	SEP	24-1/2	7		3	1		25
	OCT	37	10		1	4		80
1961	MAR	7-1/2	2			1		100
	JUN	76-5/8	20			4	1	80
	OCT	90-1/8	24	1	2	5		73
	NOV	13	4		1	1		50
	DEC	29-3/8	8			2		100
1962	JAN	22-1/2	6		1	1		50
	MAR	37-1/2	10			1		100
	APR	12	3		1			-
	MAY	20-3/4	6			2		100
TOTALS		372"	100%	1	9	22	1	

The remaining 21 percent of the news was sporadically distributed over the 21-month period, concentrating, however, in the fall of the year. Several of these news items were concerned with measures that were voted upon during the fall session of the legislature.

An analysis of the initiators of air pollution headlines revealed that air pollution scientists stated the most themes, with industrial managers, municipal officials, public health officials, state officials, and civic group leaders also contributing headline themes. Secondary themes were contributed by air pollution scientists, PFI managers, public health officials, and state officials. Table G-2 summarizes this information.

Analysis of headline themes by various spokesmen revealed that air pollution scientists were concerned with the need for more air pollution research. They also reported that PFI had made a grant for air pollution research. While reporting about the need to make more effort

Table G-2. SUMMARY OF "WHO" CATEGORY EXPRESSING AIR POLLUTION THEMES

"WHO" CATEGORY	NO. OF HEADLINE THEMES	NO. OF SECONDARY THEMES
Air Pollution Scientists	6	3
Industrial Managers	6	2
Municipal Officials	6	0
Public Health Officials	5	2
State Officials	3	1
Citizens Groups	1	0
Not Specified	12	0
TOTALS	33	8

to control air pollution, PFI managers also reported that they were cooperating to reduce air pollution. Public Health officials, on the other hand, reported almost exclusively on the local USPHS air pollution study, while municipal officials were wholly concerned about the need to increase efforts to control air pollution. Municipal officials also reported on attendance at the University of Idaho air pollution conference. These data are summarized in Table G-3.

Analysis of the secondary themes revealed three clusters of two responses each: One, industrial leaders revealed they were cooperating to reduce air pollution; two, air pollution scientists from Washington University revealed they were about to embark on the PFI sponsored air pollution study; and three, state officials disclosed the state would assist in the USPHS study. These data are also summarized in Table G-3

Concerning the manner in which the themes were made, 46 percent of the themes were of the opinion type while 54 percent fell into the information type.

The themes most frequently occurring in the headlines of the news items are rank-ordered as follows (the number of themes appears in parentheses):

1. Someone is performing air pollution research. Most frequently the Public Health Service, the state university, or a research agency is mentioned (11);

2. There is a need for more effort to control air pollution. This is

Table G-3. A SUMMARY OF THE THEME AS EXPRESSED BY VARIOUS SPOKESMEN

	SPOKESMAN								
HEADLINE THEMES	State Authorities	Municipal Officials	Citizens Group	Public Health Officials	P.F.I. Managers	Air Pollution Scientists	Students	No Spokesman	TOTALS
Need for more air pollution research				1		2		1	4
Need to make more effort to control air pollution	1	2			2			1	6
Need for more restrictive air pollution legislation			1						1
Contributed financially to air pollution control						2		2	4
Was active participant in air pollution communication					1			1	2
Was passive participant in air pollution communication		2						1	3
Was recipient of air pollution honor								1	1
Cooperated to reduce air pollution					2				2
Is performing air pollution research	1			4	1	1		4	11
TOTALS	2	4	1	5	6	5		11	34
NON-HEADLINE THEMES									
Need for more air pollution research					1				1
Need to make more effort to control air pollution				1					1
Need for more restrictive air pollution legislation									
Contributed financially to air pollution control						1		1	2
Was active participant in air pollution communication				1					1
Was passive participant in air pollution communication								2	2
Was recipient of air pollution honor								2	2
Cooperated to reduce air pollution					2				2
Is performing air pollution research	2					2		3	7
TOTALS	2			2	3	3		8	18

a need that must be met jointly by PFI, the municipal government, air pollution scientists, and the general public (6);

3. There is a need for more air pollution research, primarily by air pollution scientists, PFI, and federal agencies responsible for this activity (4);

3. Someone contributed financially to air pollution control. PFI was most frequently mentioned. The Federal Government was the only other agent mentioned more than once (4);

5. Someone was a passive participant in air pollution communication. In this category the state university, air pollution scientists, or state or federal leaders directly involved in air pollution control were mentioned (2);

6. Potlatch Forest Industries cooperated to reduce air pollution (2);

8. Someone received an air pollution honor. An individual who in public life voluntarily contributed his talents to reduce air pollution was mentioned (1);

8. There is a need for more restrictive air pollution legislation (1).

Other themes, appearing in the body of the news items, are rank-ordered as follows:

1. Someone is performing, or is going to perform, or has completed air pollution research (7);

6. There is a need for more air pollution research (1);

2. Someone contributed financially to air pollution control (2);

2. Someone was a passive participant in air pollution communication (2);

2. Someone was a recipient of an air pollution honor (2);

6. Someone needs to make more effort to control air pollution (1);

2. Someone cooperated to reduce air pollution (2).

Analysis of the agents who performed an action or who are charged with the need to perform an action revealed the following: Action was expressed 75 percent of the time and need for action 25 percent of the time. Headlines expressed action 70 percent of the time and need for action 30 percent of the time. The body of the news contained action 89 percent of the time and need for action 11 percent of the time.

The agents credited with performing the actions are rank-ordered in Table G-4. Industry is credited with twice as many actions as is the Federal Government, the second agent in the rank-order.

Table G-4. SUMMARY OF ACTIONS PERFORMED AND NEEDS EXPRESSED BY VARIOUS AGENTS

RANK ORDER BY HEADLINE	AGENT	HEADLINE		BODY OF ITEM	
		NEED	ACTION	NEED	ACTION
1	No Spokesman	2	9	0	8
3	Municipal Government	3	2	0	0
3	Industrial Managers	2	3	0	2
2	Air Pollution Scientists	2	4	0	3
5	Public Health Officials	1	3	2	1
6	State Official	1	1	0	2
7	Citizens Groups	1	0	0	0
	TOTALS	12	22	2	16

Air Pollution Process

Since only two headlines identified a specific pollutant, the air pollution process was not analyzed in terms of headline and secondary content. Both headlines, incidentally, identified smog as the pollutant.

Frequently news items containing air pollution news were not concerned with the air pollution process; for example, where the news item reported a pending air pollution conference. In situations like this, the news item was not analyzed for the air pollution process. This situation occurred six times, thereby reducing the news items available for the air pollution process from 33 to 27.

A difficulty encountered in this analysis was the vague way in which the news item related the pollutants, sources of pollutants, and the things affected by the pollutant. Consequently, rather than trying to match the pollutant with a source that affected a particular thing, each pollutant mentioned in the news item was associated with each source mentioned in the news item. Although this procedure produced a few unusual relationships, such as homes being a source of dust in the air in one case, it was felt that the procedure was necessary if objectivity was to be maintained, for most news items would have required a subjective matching on the part of the analyst.

Concerning the findings from the air pollution analysis, Table G-5 reveals that PFI was mentioned most frequently as the major source of air pollution. Vehicles, homes, incinerators, and lastly dumps were also listed in descending order. Sulphur and odors proved to be the major pollutants mentioned, with smoke, smog, fumes, and dust following in descending order.

Table G-5. SUMMARY SHOWING RELATIONSHIPS BETWEEN SOURCE OF POLLUTANTS AND THE POLLUTANTS

	RANK ORDER OF SOURCE						
RANK ORDER POLLUTANT	1. P F I	2. Non-specific	3. Vehicles	4. Homes	5. Incinerators	6. Dumps	
General – Unspecified	7	12	3	1	2	0	25
Odors	3	3	2	1	1	1	11
Sulphur	3	1	2	3	1	1	11
Smoke	4	1	1	2	1	1	10
Smog	4	0	1	1	1	1	8
Fumes	2	0	1	0	1	0	4
Dust	1	0	1	1	0	0	3
TOTALS	24	17	11	9	7	6	72

Table G-6 reveals that "personal comfort" was reported in the news items most often as being affected by air pollution, with health and property also significantly affected.

Table G-7 indicates that "PFI" and "vehicles" account for half of the ill effects reportedly suffered from air pollution.

Summary

This analysis has tried to show how air pollution news was presented to the public in the Lewiston-Clarkston Valley. Generally, there were a few categories of spokesmen who concentrated upon a limited number of themes. The relative importance of the issue of air

Table G-6. SUMMARY SHOWING RELATIONSHIP BETWEEN POLLUTANTS AND THINCS OR ACTIVITIES AFFECTED

	RANK ORDER OF THINGS AFFECTED						
RANK ORDER OF POLLUTANT	1. Personal Comfort	2. Non-specific	3. Health	4. Property	5. Animal Wild Life	5. Plants Uncultivated	TOTAL
General – Unspecified	5	9	4	4	1	0	24
Odors	4	2	1	2	0	0	9
Sulphur	4	0	1	2	0	0	7
Smoke	3	1	2	0	0	0	6
Smog	2	1	2	0	0	0	5
Fumes	0	0	2	0	0	1	3
Dust	1	0	0	0	0	0	1
TOTAL	19	13	12	8	1	1	55

Table G-7. SUMMARY SHOWING RELATIONSHIP BETWEEN SOURCE OF POLLUTANTS AND THINGS OR ACTIVITIES AFFECTED

	RANK ORDER OF THINGS AFFECTED						
RANK ORDER SOURCES	1. Personal Comfort	2. Property	2. Health	4. Non-specific	5. Animal Wild Life	5. Uncultivated Plant Life	TOTAL
P F I	7	5	5	4	0	1	22
Non-Specific	4	2	1	8	0	0	15
Vehicles	4	3	4	0	0	0	11
Homes	1	3	4	0	1	0	9
Incinerators	4	1	1	1	0	0	7
Dumps	1	1	0	0	0	0	2
TOTALS	21	15	15	13	1	1	66

pollution in the Lewiston-Clarkston Valley compared with other issues could not be determined from the available information.

APPENDIX H

CLARKSTON AIR POLLUTION SURVEY ESTIMATION PROCEDURE, SAMPLING ERRORS, AND 95% CONFIDENCE LIMITS FOR SELECTED SAMPLE PROPORTIONS

(prepared by Research Triangle Institute)

The sample design for this survey permitted simple self-weighting estimates of population totals. Thus if x_{ijk} is the measure of a particular characteristic in the kth sample household in the jth sampling unit in the ith stratum, the estimated total is

$$\hat{T}_x = 25 \sum_{i=1}^{10} \sum_{j=1}^{2} \sum_{k=1}^{n_{ij}} x_{ijk}$$

where n_{ij} is the number of sample households in the jth sampling unit in the ith stratum.

Per household averages in the population are estimated by

$$\hat{R} = \frac{\hat{T}_X}{\hat{T}_N} = \frac{\sum_{i=1}^{10} \sum_{j=1}^{2} \sum_{k=1}^{n_{ij}} x_{ijk}}{\sum_{i=1}^{10} \sum_{j=1}^{2}} = \frac{t_x}{t_n}$$

where t_x and t_n are respective sample totals.

When the x_{ijk} can take on only the values of one or zero depending on whether or not the household possesses a certain attribute, $\hat{R}$ becomes an estimate of the proportion of households in the population possessing this attribute.

Certain attributes were estimated for subclasses of the population. In these cases the above formula was modified slightly to refer only to totals in the subclass.

In order to calculate sampling errors for the proportions estimated from the survey results, the variance of $\hat{R}$ is required. $\hat{R}$ is a ratio estimator. Its approximate variance is given by

$$\hat{V(R)} \approx \frac{1}{\bar{t}_n^{\,2}} \left\{ \sigma_{t_x}^{2} + R^2 \sigma_{t_n}^{2} - 2R \operatorname{cov}(t_x, t_n) \right\}$$

where

$\bar{t}_n$ = expected sample size

$\sigma_{t_x}^{2}, \sigma_{t_n}^{2}$ = variances of respective sample totals

R = true proportion

and $\operatorname{cov}(t_x, t_n)$ = the covariance of the respective sample totals

For the particular sample design used the estimate of $V(\hat{R})$ reduces to

$$\hat{V}(\hat{R}) = \frac{1}{t_n^{\,2}} \left[\sum_{i=1}^{10} (x_{i1} - x_{i2})^2 + (\hat{R})^2 \sum_{i=1}^{10} (n_{i1} - n_{i2})^2 - 2(\hat{R}) \sum_{i=1}^{10} (n_{i1} - n_{i2})(x_{i1.} - x_{i2.}) \right]$$

where $x_{i1.} = \sum_{k=1}^{n_{i1}} x_{i1k}$, etc.

The standard error of an estimate is

$$s_{\hat{R}} = \sqrt{\hat{V}(\hat{R})}$$

Approximate $(1 - \alpha)$ percent confidence limits for R can be constructed by adding and subtracting $t_\alpha s_{\hat{R}}$ to the sample estimate, where t_α designates the appropriate t value from tables of Student's t distribution. Since there are ten degrees of freedom available for the estimate of $V(\hat{R})$ the appropriate t value for 95% confidence limits is 2.228. The 95% confidence limits for R are therefore given by:

Lower limit: $\hat{R} - 2.228\, s_{\hat{R}} = \hat{R}_L$

Upper limit: $\hat{R} + 2.228\, s_{\hat{R}} = \hat{R}_U$

The following table presents estimated proportions, estimated absolute errors, and 95% confidence limits.

	Characteristic	$\hat{R}$*	$s_{\hat{R}}$†	R_L‡	R_U‡
1.	Proportion of all respondents rating Clarkston as a place to live: Excellent	.259	.039	.172	.346
	Good	.587	.042	.493	.681
	Fair, Poor, Very Poor	.144	.047	.039	.249
3.	Proportion of all respondents not listing air pollution disadvantage	.673	.020	.628	.718
3.	Proportion of air pollution disadvantages listed:				
	Bad air, poor air	.147	.046	.044	.250
	Haze, smog, smoke, low visibility	.117	.053	---	.235
	Odors	.676	.083	.491	.861
3.	Proportion of disadvantage by source:				
	Mill, pulp mill, paper mill	.735	.102	.508	.962
6(1).	Proportion of all respondents -- health problems that need correction:				
	Yes	.346	.058	.217	.475
	No	.587	.068	.435	.739
(2).	Proportion of yes's:				
	Dump	.055	.039	---	.142
	Pulp mill	.361	.093	.154	.568
9.	Proportion of all respondents rating air pollution:				
	Serious	.240	.044	.142	.338
	Somewhat serious	.471	.051	.357	.585
	Not serious	.230	.025	.172	.288

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* Percentage in sample.

† Standard error of R.

‡ 95% confidence limits.

	Characteristic	$\hat{R}^*$	$s_{\hat{R}}^{\dagger}$	$R_L^{\ddagger}$	$R_U^{\ddagger}$
10(2a).	Proportion of respondents considering requesting action on health problems by problem:				
	Air pollution	.700	.187	.238	1.000
11.	Proportion of all respondents -- is there air pollution in Clarkston:				
	Yes	.786	.036	.706	.866
	No	.203	.037	.121	.285
13(1).	Proportion of yes's (Items 11, 13 to 18):				
	Not bothered	.172	.049	.063	.281
	Somewhat bothered	.641	.050	.530	.752
	Bothered quite a lot	.172	.038	.087	.257
13(1)A.	Of those bothered:				
	More	.075	.024	.021	.129
	Some	.681	.086	.489	.873
	Less	.166	.060	.032	.300
14.	Air pollution:				
	Cannot be reduced	.037	.027	---	.097
	Can be reduced	.580	.068	.428	.732
	Can be eliminated	.209	.043	.113	.305
15.	Major sources:				
	Mill, pulp mill (1st source)	.925	.022	.876	.974
	Dump (2nd source)	.061	.019	.019	.103
	Packing plant (2nd source)	.037	.026	---	.095
16.	Effort of source to control air pollution:				
	Little or no effort	.246	.048	.139	.353
	Some effort	.493	.058	.364	.622
	A great deal of effort	.185	.048	.078	.292
17.	Worry about effects of air pollution on health:				
	Yes	.320	.026	.262	.378
	No	.629	.025	.573	.685
18.	Worry about effects of air pollution on property:				
	Yes	.407	.058	.278	.546
	No	.518	.063	.378	.658
19.	Proportion of all respondents who think local doctors:				
	Feel there is no air pollution	.038	.017	---	.076
	Feel air pollution not serious	.310	.049	.201	.419
	Feel air pollution serious	.184	.026	.126	.242
	Don't know	.446	.060	.312	.580

Characteristic	$\hat{R}$*	$s_{\hat{R}}$†	R_L‡	R_U‡
19. Proportion of all respondents who think local papers:				
Feel there is no air pollution	.097	.031	.028	.166
Feel air pollution not serious	.300	.064	.157	.443
Feel air pollution serious	.135	.025	.079	.191
Don't know	.398	.048	.291	.505
19. Proportion of all respondents who think major local industries:				
Feel there is no air pollution	.165	.034	.089	.241
Feel air pollution not serious	.514	.051	.400	.628
Feel air pollution serious	.058	.018	.018	.098
Don't know	.233	.034	.157	.309
20. Proportion of all respondents who think air pollution means:				
Bad smells -- Yes	.913	.026	.855	.971
No	.077	.024	.024	.130
Dirt and dust in air -- Yes	.269	.042	.175	.363
No	.673	.051	.559	.787
Frequent haze or smog -- Yes	.740	.055	.617	.863
No	.221	.054	.101	.341
Frequent irritation of the eyes -- Yes	.403	.043	.307	.499
No	.509	.033	.435	.583
Frequent nose or throat irritation -- Yes	.615	.030	.548	.683
No	.317	.029	.252	.317
21. Proportion of eligible respondents -- for most recent years:				
Air pollution not been serious problem	.250	.034	.174	.326
Air pollution has become more serious each year	.250	.048	.143	.357
Air pollution has become less serious each year	.200	.047	.095	.305
Air pollution has continuously been a serious problem	.270	.050	.159	.381
22. Proportion of all respondents -- what people should do about air pollution:				
Ignore	.058	.028	---	.120
Support industry efforts	.375	.029	.310	.440
Ask elected officials for controls	.336	.053	.218	.454
Try to get more information	.201	.027	.141	.261

Characteristic	$\hat{R}$*	$s_{\hat{R}}$†	R_L‡	R_U‡
23(1). Proportion of all respondents: Seen anything in papers about air pollution --				
Yes	.317	.046	.214	.420
No	.682	.049	.573	.791
(2). Proportion of yes's: Reference to public opinion survey	.121	.067	---	.270

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